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S'il est possible de perfectionner l'espèce
humaine, c'est dans la médecine qu'il faut
en chercher les moyens.
　　　　　—DESCARTES

THIRD VOLUME

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Archives of Medicine.

Original Articles.

GYNECOLOGY AS RELATED TO INSANITY IN WOMEN.

By ALEX. J. C. SKENE, M.D.,

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THE relations which exist between the sexual organs of women and diseases of the brain and nervous system, had occupied some of my time and attention in the past, but my opportunities for observation were limited, until Dr. J. C. Shaw, the Medical Director of the Kings' County Insane Asylum at Flatbush, invited me to take charge of the gynecological practice in that institution, counting among its inmates about four hundred female patients. This gave me extended facilities for studying this special department of medicine as it presents itself among the insane.

Upon entering this field of observation, I was confronted with an entirely new phase of practice, in which the ordinary methods of investigation were of little value. No correct histories could be obtained from the patients themselves, and the records kept by the physicians in charge, though full and correct in all that pertained to the mental conditions, afforded but little information of value to the gynecologist.

The routine business common to all these institutions, made it imperative to acquire the art of investigation in this

department.   Information was sought in records, regard-
ing gynecological practice among the insane, without avail,
and so I was obliged to devise a method of examining
patients.

The system of investigation adopted, and the phenomena
observed, together with the deductions drawn therefrom,
form the subject matter of this paper.

It should be clearly understood that the subject to be dis-
cussed is limited simply to the relation which gynecology
bears to insanity.

Regarding the etiological relations of diseases of the brain
and sexual organs, little need be said at this date.   I take
it for granted that all will agree that insanity is often
caused by diseases of the procreative organs, and on the
other hand, that mental derangement frequently disturbs
the function of other organs of the body, and modifies
diseased action in them.   Either may be primary and caus-
ative, or secondary and resultant.   In the literature of the
past, we find the gynecologist pushing his claims so far as
to lead a junior in medicine to believe that if the sexual or-
gans of women were preserved in health, insanity would
seldom occur among them.   While the psychologist, or
alienist, holds that women will lose their reason and regain
it, without much help or hinderance from their reproductive
organs.   The ablest and best men on both sides take the
human organization as a whole, and give to each portion its
legitimate share of credit for good and evil.   On this branch
of medicine the boundary lines which divide the gynecolo-
gist and psychologist often touch and cross each other, and
it is necessary that we should know where they subtend, and
where they diverge.   To know this will insure a cordial
agreement as to when the two specialists shall act separate-
ly, and the conditions which require them to labor together
for the benefit of those who suffer in body and mind.

From my investigations, I have been led to the belief that up to the present time the effect of disease of the sexual organs in women, in causing and keeping up insanity, has been more correctly studied than the influence which insanity exercises upon the sexual organs. This opinion may have been formed from the fact that my observations have been made especially from the standpoint of the gynecologist, and therefore the other side of the question has not been so clearly seen. But the reasons for holding this belief are, that the one line of investigation is easier than the other, and our literature shows that most investigators have chosen the sexual organs as the starting-point of their inquiries. The gynecologist has the advantage of knowing when his patients have uterine or ovarian disease, and if insanity follows in any of his cases, he may be able to estimate the influence of the primary disease in causing the mental disorder. On the other hand, the psychologist may have a number of insane patients who suffer from uterine and ovarian diseases which may escape his notice. This may readily occur even among the cases of insanity caused by diseases of the sexual organs. Derangement of the mind often obscures all the symptoms of disease, and therefore the medical attendant is liable to be misled. One is not apt to overlook insanity in patients known to have disease of the sexual organs, and hence the advantage that the gynecologist has in studying the relations of these two forms of morbid action. For reasons such as these, we should not find fault with psychologists for not having done more to develop this branch of medical science, but rather remind gynecologists that they have done so little, considering their opportunities.

At this point, attention may be directed to the way in which diseases of the sexual organs cause insanity. We have long recognized the cause and the effect, but the mode

of action of the one in producing the other may be admitted, in many cases at least, as an open question.

The rule has been to attribute insanity (when developed during the existence of uterine or ovarian disease) to reflex action. The well-known book by Dr. H. R. Storer affords a notable example of the position given to reflex action in the etiology of insanity. This no doubt is an important factor in the cause of mental derangement, but it is far from covering the whole ground. An acute disease of the ovaries or uterus, or a displacement of either, is sufficient to cause a mental derangement (in some highly sensitive organizations) which will subside when the disease of the pelvic organ is relieved. Such cases are no doubt reflex in character, but there are a great many more cases of insanity that can be traced to the sexual organs in which reflex action takes no part. Take, for example, cases of uterine disease, preceding by an interval of years the mental derangement which follows without any increase of the primary disease. In such cases it is probable that impaired nutrition of the brain, which occurs as the result of prolonged suffering, is the direct cause of insanity, and not the result of reflex action from the disease of the sexual organs. The irritation and exhaustion produced by uterine or ovarian disease is simply the predisposing indirect cause of the insanity, while the direct cause is some lesion of nutrition of the brain itself.

One of the most marked and important causes of insanity among women is clearly traceable to frequent child-bearing and lactation among the poorer classes. This extraordinary taxation imposed by their maternal duties deranges the mind of a vast number of women. This fact is quite familiar to medical men, and has been proved to my own satisfaction by clinical observation, and a perusal of the records of all the asylums in this country. From these reports I find that

the largest number of insane women are found at from twenty-five to forty years of age, and that of these a large percentage have been married and have had children. Of this number, some may have had disease of the sexual organs, but there can be no doubt that a large number become insane from the exhaustion of frequent child-bearing and lactation, without any other complications. These cases of insanity can be traced indirectly to extra-ordinary functional activity of the sexual organs, but can-not be called cases of reflex insanity. There is a diffi-culty in turning the records of asylums to account, because they are not kept so as to bring out the history of the sexual organs, or the relation of their diseases to insanity. Nevertheless, there are facts sufficient to show that child-bearing and lactation bear an important relation to mental disorders.

There is too little in our literature on the subject of mania caused by the exhaustion of the nervous system from child-bearing and nursing. The true bearing of the sexual organs in this connection is liable to escape notice, because the mental weakness or nervous exhaustion is the first mani-festation of disease. There is no uterine or ovarian disease to attract the physician's attention while he is seeking for the cause of mania. Our books tell us of anæmia from pro-longed lactation, but say little of the nervous exhaustion which may or may not be accompanied by anæmia.

Every practitioner has observed the conditions of mental depression and nervous irritation and debility which occur during the child-bearing period of women's life. We may go beyond the apparent effects of rapid and long continued reproduction and ask the question, why the execution of this normal function should so often sacrifice the mental and physical health of the woman? The answer is, that too many other duties are usually imposed upon women during

the age of reproduction. Among the poor the wife is re-
quired to work for her livelihood, as well as to give life and
sustenance to her children; even among the rich we will
often find that very little allowance is made for maternal
duties. These combined exertions of reproduction and
every day labor to which so many women are subjected, are
more than the strongest constitution can endure. This will
be granted by the most fanatical believers in the mental and
physical capabilities of women. It may oe questioned if
even physicians at all times fully appreciate the demand
made upon the female organization by reproduction. During
pregnancy, there is often an apparent or real increase in the
nuitrition of the individual, which gives the highest evidence
of good health; there is also manifest ability to do ordinary
work that is surprising. But if this power is abused, as it
often is, the result must be general debility. The resistance
to this over-taxation may be and often is maintained for a
long time. The first pregnancy and lactation do not necessa-
rily break down the constitution, but the repetition of these,
with the duties and cares which multiply as life advances,
exhaust the nerve power, and lead in many cases to mental
derangement. This is especially so among those who have
been raised in ease and comfort without acquiring habits of
industry. When daughters of these families marry into less
affluent circumstances, or when fortune turns against the
young wife and mother, and disappointment and privation
are added to the taxation of household duties and the rais-
ing of a family, then we have all the conditions necessary to
cause insanity. Many cases having such a history can be
found in our asylums. The insanity occurring under such
circumstances is generally centric and not reflex, and yet
dependent to some extent on the sexual organs.

Many authorities might be quoted to prove that the
normal functional activity of the reproductive organs some-

times tends to undermine the brain and nervous system to an extent sufficient to lead to insanity, and I am satisfied, from cases occurring in my own practice, that it occasionally does so.

There is a prevailing opinion that insanity occurs very frequently at puberty, and the cause in such cases is generally ascribed to reflex action. This no doubt is frequently the true cause, but is not always so. Mental and emotional excitement occurring in connection with demands of the reproductive system abruptly made at that time, may develop insanity at puberty, when the sexual organs are well developed and perform the function of menstruation normally. Again, insanity occurring at the menopause, in place of being due to disease of the sexual organs, can often be traced to deranged conditions of the general system, such as imperfect elimination, or as the older authors state, the sudden suppression of an accustomed discharge.

There are other causes of insanity, such as the puerperal state and venereal excesses, which are fully discussed in our books and need not be mentioned here. Enough has been said to show that a clear distinction should be made, in the study of etiology, between insanity caused by existing active disease of the sexual organs, and insanity arising from brain exhaustion produced by prolonged or excessive functional activity of these organs while free from any disease. We incline to the belief that as many or even more cases of insanity can be traced to the latter, *i.e.*, exhausting activity, as to the former, *i.e.*, active disease of the sexual organs. The bearing of these facts upon the diagnosis and treatment of insane women will be apparent to all medical men. In the one class of cases the sexual organs require no attention, except as factors in the indirect cause of the mental affection ; while in the other the disease of the

sexual organs is the direct cause of insanity, and tends to keep it up until removed by the treatment which ought in all cases to be instituted.

Having briefly referred to some of the influences of the sexual organs in causing insanity, the next question which we propose to discuss is the effect of insanity upon the function of the reproductive system. Observations were made on two hundred women ranging in age from 17 to 46 years, the period of active functional life of the sexual organs. These observations were continued during six months, and at the end of that time eight were lost, some by death, and the others discharged from the asylum. Of the remaining 192, there were only 27 who menstruated regularly and normally ; 30 did not menstruate at all ; 4 menstruated once ; 8 twice ; 10 three times ; 18 four times ; 34 five times ; 24 six times at irregular intervals ; 31 seven times and 6 eight times during the six months. This record shows to what a marked extent the menstrual function is disturbed among insane women. There are perhaps no other conditions in which two hundred women possessing the same degree of physical health could be found with menstrual derangements to the same extent. These disorders of menstruation are accounted for in two ways. The impaired general nutrition which prevails so extensively among the insane is sufficient to arrest the menses in a large proportion of cases. The general health is reduced so far below the normal standard, as to compel the individual to suspend all functional activity not absolutely necessary to life. The same symptoms occur in any of the exhausting diseases, such as phthisis pulmonalis, as every physician well knows. The amenorrhœa is conservative when it occurs under such circumstances, and should not be considered abnormal, but as a fortunate provision of nature to relieve an overtaxed organization from a duty

which can be neglected with less injury to the individual than any other function. That the suspension of menstruation is caused by mal-nutrition, is evident from the fact that the same condition occurs in other diseases when the nutrition is markedly impaired. Additional proof is also obtained from the fact that the sexual organs in such cases are generally found to be anæmic, presenting the appearance of those who have passed the menopause, except that there is not always atrophy such as we find in the very aged. A sufficient number of the cases having suppression of the menses that are recorded in the table were carefully investigated to show that there was, in most of them, impaired nutrition of the sexual organs, to account for the amenorrhœa. On the other hand, amenorrhœa finds its cause in the diseased nervous system alone. A few cases, and especially one, came under observation in which the general nutrition was normal, the pelvic organs were in a healthy condition, and still there was amenorrhœa due, beyond doubt, to imperfect innervation. An abundance of proof could be brought forward to show that deranged innervation, such as occurs among the insane, causes suspension of the function of the sexual organs; but it will suffice to recall the fact that mental shocks, prolonged mental anxiety and the like have been long recognized as causes of acute suppression of the menses. Cases without number are on record which establish that.

As a number of patients who came under my care menstruated regularly, and some of them had menorrhagia, or too frequent menstruation, the question arises, why was that the case, all of the patients being insane ? According to the rule forced upon us, that insanity tends to suspend the menstrual function, all the insane should have amenorrhœa, but they do not. The answer then is, that men-

struation is affected in proportion to the degree of insanity. In those patients who menstruated normally, the insanity was of a mild type, not sufficient to impair either the nutrition or the innervation of the pelvic organs to any marked extent; and in those who suffered from menorrhagia, or too frequent menstruation, there was some form of uterine disease present.

The deductions drawn from the phenomena observed may be formulated as follows: Well-developed insanity, with impaired general nutrition, causes suppression of the functions of the sexual organs. Deranged innervation tends to produce the same result. In mild forms of insanity menstruation may continue normal. Excessive menstruation among the insane is usually caused by uterine disease, and should be accepted as evidence of such.

The opinion just stated is based upon clinical observations of the menstrual function, which may be taken to a great extent at least, as an index of the condition of the organs concerned. It cannot, however, be claimed that amenorrhœa is a sure indication that all the functions of the sexual organs are suspended. We know well that ovulation may continue, while menstruation is absent, and so may the venereal desire, but such cases are exceptional. Moreover, there are other reasons for believing that a general functional inactivity prevails in those cases, characterized by amenorrhœa. In a few cases of this class, when a post-mortem examination has been made, the evidences of ovulation have been absent. More facts are needed to fully establish this point; still enough have been obtained to show that ovulation is arrested in some cases of insanity. Again, maternal and marital affections (ruling passions in women) are, as a rule, rarely manifested by this class of insane women. This would also tend to prove that the sexual organs return for the time to a condition of functional inaction resembling that of childhood or advanced age.

Trusting that sufficient evidence has been produced regarding the influence of insanity upon the function of the sexual organs, the question which follows in succession is, what effect does insanity exert upon their diseases?

We shall first take up the functional diseases of the uterus; and, according to the necessities arising from the character of our nomenclature, we must include under this head all those affections in which the function of the organ is deranged, because of an impaired innervation and blood circulation.

It appears that all authorities upon uterine pathology agree that in a host of cases of uterine diseases met in practice, there exists an excess of nerve irritability and hyperemia, without any well defined change in the structure of the tissues, excepting that which occurs in all pathological congestions. A condition which implies a change in the quantity of blood and calibre of the vessels, which is not permanent, but disappear under influences which enable the vessels to regain their original size and tonicity. This class of diseases is distinct from the organic, in which well-defined and easily recognized changes of structure exist. For want of a more comprehensive and accurate name, these are called functional affections.

The influence of insanity on this class of diseases is most favorable. It may be stated fairly that such diseases disappear upon the occurrence of mental alienation. To use a popular, but unscientific expression, insanity tends to cure functional diseases of the uterus. This statement may excite question and opposition, but clinical observation compels this conclusion and renders it worthy of the highest consideration. It should be clearly borne in mind that the influence of insanity does not extend beyond this class of diseases; that it does not affect organic diseases to the same extent at least. This is not claimed by any means, but the

effect upon the functional forms of disease is marked, and we think unquestionable. There are exceptional cases no doubt, but the rule holds good. The subjects of masturbation, and those who labor under a mental derangement of a venereal kind, while free from uterine and ovarian disease, have centric affections only, and belong to a class to be referred to at another time.

Attention was first directed to this subject by watching the progressive history of a case which was under observation for congestion of the uterus and leucorrhœa. She became insane, and her uterine disease disappeared without local treatment. The disease of the uterus, added to other causes of mental disturbances, was supposed to have acted a part in the causation of her insanity. Other cases followed this one, until sufficient material was obtained to show the relationship of the mental and uterine disease. Some cases, indeed quite a few, whose history of former uterine diseases I obtained through friends, when examined in the asylum, were found to have recovered. The disappearance of functional uterine disease upon the occurrence of insanity agrees with the facts observed, regarding the influence of mental alienation on the function of the sexual organs. That the vital activity of an organ or system can be lowered by the influence of disease existing elsewhere in the organization to an extent sufficient to cause arrest of function, is evidence that functional disease may disappear under the same circumstances. The same action is observed in the pathology of other diseases. The literature of medicine furnishes numerous illustrations of the fact that disease in one portion of the body may disappear upon the development of morbid action in another. This is all comprehended under the head of the antagonism of diseases, the same law which recognizes the physiological antagonism of medicines. It is not claimed that all func

tional disease of the uterus disappear when insanity is developed ; but this occurs so generally, that those cases in which the uterine derangements persist, may be classed as exceptional.

This peculiarity of uterine disease among the insane has probably led psychologists to attach but little importance to uterine disease as complicating mental affections. This is the only reason or excuse for those who claim that the sexual organs require but little notice from those who have the care of insane patients. Such observers have caught a fraction of the truth, and endeavor to make it cover more ground than belongs to it. The influence of insanity in arresting the progress of uterine disease relates almost exclusively to the class of affections above stated, and does not apply to other forms of local disease of an organic character. Those who claim much more are as far from the right as the gynecologist, who believes that the great majority of women who lose their reason do so because of disease of the sexual organs, and that all insane women should be placed in charge of the specialist for diseases of women.

The class of insane women who have simply functional diseases of the sexual organs requires no care from the gynecologist, beyond what is necessary to establish the fact that there exists no organic disease. This in itself is an important service, and one which the gynecologist only can render ; but when the diagnosis is settled in the negative, the patient should be left to the psychologist. The relief of deranged menstruation and functional diseases must come through improvement of the general health and the cure of the insanity, and not by any local treatment, except hygienic, and this the alienist is as competent to afford as the gynecologist.

The same rule of practice should be followed in the man-

agement of this class of patients that is observed in cases in which the function of the sexual organs is deranged from any other disease of the general system, like pulmonary phthisis, nervous exhaustion, and such like ; *i.e.*, to restore the general system to health, and trust that restoration of the sexual organs will follow.

There is one class of insane patients, already referred to, in which there appears to be a functional derangement of the sexual organs, which would apparently call for the gynecologist's care ; viz., those who manifest insane sexual desire, or whose ravings are obscene and licentious. Such cases often take their origin in some disease or abuse of the sexual organs, which either disappears or eludes the diagnostic skill of the gynecologist.

While the mental derangement points to trouble of the pelvic organs, no disease can be detected. Local treatment in such cases can effect no benefit, because the disease is centric and not reflex ; hence the treatment must be directed to the nervous system. When it is stated that manifestations of sexual excitement may originate in the brain or nervous system, we have clearly in mind that the same symptoms may arise from disease of the pelvic organs, and will refer to that class of cases at another time. We take the ground that abnormal sexual excitement sometimes has its origin in the nerve centres, and that too when the sexual organs are free from disease, and that a mental derangement of an emotional character may continue after the disease which caused it has subsided. The importance of clearly distinguishing disease of the sexual organs that cause and tend to keep up insanity, and mental derangements, which exists independent of lesion of other organs, can hardly be over-estimated.

Organic diseases of the sexual organs exercise a most important influence in causing insanity, and tend to retard

recovery from it.   Under that head are included all the appreciable diseases of the ovaries, uterus and vagina, that are characterized by change of structure or position.   These need not be named individually, but I may mention some conditions that are more properly called results or products of disease, in contradistinction to active morbid processes. Such are the products of pelvic peritonitis and cellulitis, cicatrices of the cervix and vagina.   These, by adhesion and contractions, often cause severe pelvic pains, sufficient to induce or keep up insanity.

These affections of the sexual organs frequently cause insanity directly or indirectly, and unlike functional diseases, are not as a rule relieved by the mental derangement which follows.   It is evident that no disease of the brain or nervous system could favorably influence a displacement of the uterus or the ovaries, nor modify the ill-effects of a laceration of the cervix, nor check a leucorrhœa due to that lesion of the organ.   On the contrary, insanity which too often debars the sufferer from requisite treatment, and even the care that she would take to favor her infirmities while in sound mental health, tends to prolong if not to aggravate the pelvic disease.   These diseases of the sexual organs remain as a disturbing element to keep up the derangement of the brain, or at least to retard recovery. In this way the insanity and the disease of the sexual organs act in concert to maintain each other to the detriment of the unfortunate sufferers.   There are but few cases in this class, where the disease of the pelvic organs can be lessened in severity by the presence of insanity.   The general anæsthesia which occurs in some forms of insanity, may relieve the patient from the suffering of pelvic pain arising from old adhesions.   So also a dysmenerrhœa, which is largely due to an exalted nerve irritability, may be modified or entirely relieved.   In prolapsus of the ovaries

and chronic ovaritis, the pain may be calmed by the mental derangement as by opium, but still in such cases, although the patient appears to suffer less, the question may be asked, does not the disease exert as powerful an energy for evil upon the brain and nervous system of the sufferer? It is possible that while the patient is so fully engaged with insane fancies as to disregard physical pain, the local irritation exists none the less, exercising its depressing influence. Be this as it may, it is certain that whenever disease exists in the sexual organs of insane women, the condition of the brain, if influenced thereby at all, must be affected unfavorably. If such diseases of the sexual organs are capable of causing insanity, (a fact that appears to be settled by our best thinkers on both sides) they must also tend to keep it up. It is to this class of genital affections among the insane, that the science and art of gynecology applies with most marked advantage. Functional derangements and diseases of the sexual organs among the insane may be left alone, and the patients committed to the psychologist, with confidence that they will secure all the benefits that medical science can afford. In this department those who care for the insane may insist upon non-interference from us. But when insane women have organic diseases, they have a right to all the relief that they can obtain from gynecology, and that is certainly very much.

Another question follows at this point: What are the ascertained effects upon the insane of curative treatment of the co-existing diseases of the sexual organs.

Any one who is familiar with our current literature would, on first thought, be prompted to say that the results are very gratifying,—even wonderful. There are cases without number recorded in which all varieties of strange nervous affections and mental disorders have disappeared as if by

magic, upon the replacement of a dislocated uterus, or the restoration of a lacerated cervix. Much of this literature may be worthy of acceptance as exact science, but there is much of it that may be challenged as having no other claims upon our notice than the fact that recovery of one affection followed the cure of an accompanying one ; but what relation the one had to the other remains a mystery. To accept all such testimony as correct, would be as unsafe as to believe that sense and reason could be promptly restored to all insane women by curing any disease of the sexual organ that they had.

A careful consideration of this subject has led to the conclusion that acute affections of the brain and nervous system, that are wholly due originally to disease of the sexual organs, will be relieved, in a large majority of cases, by curing the primary affection. The effects of treatment of the disease of the sexual organs will be in proportion to the duration and severity of the mental derangement. In sub-acute mania, caused or aggravated by disease of the sexual organs, marked benefit or prompt recovery may be expected to follow the cure of the pelvic disease. On the other hand, chronic mania, associated with disease of the sexual organs, will often remain unchanged after the local disease has been relieved. That is sometimes the case when the patient's general health improves by the local treatment.

This follows the rule that is observed in other departments of pathology, in which two or more diseases are related to each other in the order of cause and effect. A secondary disease does not always disappear when the primary one, which acted as the cause of the other, is cured. This defines the limits of the success which the gynecologist may expect to have in practice among the insane.

Having endeavored to outline the conditions which de-
mand the service of the gynecologist among the insane, at-
tention is now invited to the subject of diagnosticating
diseases among this class of patients. The rules laid down
in our text-books on diseases of women for investigating
pathological conditions apply to practice among the insane
only in part.

There is an endless number of difficulties which are not
encountered among sane women. To overcome these and
find means and ways of ascertaining the clinical history and
physical indications of the state of the sexual organs, has
occupied much of our study, and the results we now
offer.

The first thing required is the natural and clinical history
of the sexual system. Very few insane patients can afford
account of themselves in this respect ; even those who com-
prehend questions and are disposed to answer them, are
often opposed to discussing their uterine conditions, and
when they can be induced to talk on the subject, the phy-
sician is left in doubt as to the correctness or value of their
testimony. We are obliged therefore to depend upon the
methods employed in the investigation of diseases in chil-
dren, and seek information from those who have had the
care of the patients. Parents, friends and nurses can gen-
erally give us the facts that we require to know. By dili-
gent inquiry in this way, the leading points in the history
of the patient up to the development of insanity can be
usually learned, and if the attention of the nurse or guard-
ian is directed to a careful observation of the function of
the sexual organs, much valuable knowledge can be ob-
tained in that way. Attention is especially directed to
this part of the clinical history of insane patients, because
it is sadly neglected by the great majority of those who
have the care of them. In looking over the records kept

in the asylums one can see how little information they afford regarding the state of the organs of reproduction. The age of patient, and whether married or single, and the number of children, if any, that she has had, is, in many institutions, all that bears upon gynecology.

For example, in the tables of nearly all the asylums for insane people in this country, we find that those showing the age at which insanity first appeared, give the number of those under 10, from 10 to 15, from 15 to 20, and so on ; or else they are arranged under 20, and from 20 to 30, 30 to 40, etc. This shows how impossible it is for any one to obtain from such tables the information which the gynecologist needs, on the relations of puberty and the menopause to insanity. These records may give the information required by the psychologist, but are of little value for our purpose. To know the condition of the sexual organs, we require all available information regarding their functional manifestations. In order to accomplish this, I arranged a case-book for use in our county asylum, which was approved by the Medical Director, Dr. Shaw. The headings in the blank pages are so arranged, as to call out the history bearing upon the condition of the sexual system, etc. Here is the history of a case as it reads from this form of record :

Date.

Name, *A*——— *M*——— Age, 30. Nativity, *Germany*.
Temperament, *Sanguine, Nervous*. Diathesis, *None*.

Development, { Mental, *Good*.
{ Physical, *Fair*. Inherited Disease, *None*.

Social condition. *Married eleven years*. No. of Children, 7.
Age of first, 10. Age of last, 8½ *ms*.
Miscarriages, Period of Gestation, Date of first, Date of last,

		Character.	Recurrence.	Duration.	Amount
Menses, First at 16	Before insanity,	*Normal*	*Every* 28 *days*	5 *to* 6 *days*	*Normal*
	after "	*Absent.*			

Effect of Menses on Nervous System before insanity, *No effect
         observed.*

Effect of Menses on Nervous System after insanity, *Not observed.*

History of Disease of Sexual Organs before insanity, *Normal until
         after her fifth child, when she had slight prolapsus of the
         uterus and bladder.*

Mental manifestations and Symptoms of Disease of the Sexual
         Organs. *Complained of weakness, while nursing her last
         three children. She walks in a stooping position ; has leucor-
         rhœa, and states that there is something in her womb which
         ought to come away.*

   Physical signs of Disease of Sexual Organs, *Uterine cavity three
and three-fourths inches long. Slight eversion of cervix ; antever-
sion of the uterus ; prolapsus of the urethra and bladder.*

   Diagnosis, *Imperfect involution and anteversion of the uterus.
Eversion of the cervix from slight laceration ; prolapsus of the
bladder and urethra.*

   Form of Insanity, *Melancholia.*

Duration
$\left\{\begin{array}{l}\text{of Insanity, } \textit{Five months.} \\ \text{of disease of Sexual Organs, } \textit{Began at the birth of her} \\ \quad \textit{last child, and increased at her last confinement eight} \\ \quad \textit{and a half months ago.}\end{array}\right.$

Cause
$\left\{\begin{array}{l}\text{of Insanity, } \textit{Exhaustion from reproduction and over-work.} \\ \text{of disease of Sexual Organs, } \textit{Debility, and resuming her} \\ \quad \textit{every-day labor too soon after confinement.}\end{array}\right.$

   A part of this history, you observe, was obtained from
the mother of the patient, who also furnished some valuable
facts regarding herself; the rest is added by the medical
attendant.

   Such a record supplies the required information for the
use of the gynecologist, and although it may not be the best
attainable, we venture to state that it is better for the pur-
pose than the records usually kept in such institutions, and
it is therefore commended to those in charge of insane
women who desire to avail themselves of the aid of those
skilled in the treatment of the diseases of women.

The design of this method of making clinical histories is to ascertain, as far as possible, the condition of the sexual organs before insanity occurred, and the relation of the mental derangement to the functions of reproduction. Then follows the history of the function of these organs as shown by the condition of the menstrual function. Lastly, the observance of such mental manifestations as may indicate the existence of disease of the sexual organs. Under this head, much valuable information may be obtained by carefully studying the patient's speech and behavior. This portion of the subject may be brought out more clearly by a few details.

Dr. Shaw called my attention to one girl who walked about the ward in a stooping position, and held her hands upon the genitals as if trying to support them. She made no complaint, nor was she sane enough to answer questions about herself, but her actions raised the suspicion that there was something wrong, and upon examination she was found to have uterine disease. Another case, a married woman and the mother of children, was able to converse quite rationally on many subjects, but was greatly disturbed by imagining that men visited her at night for unlawful purposes. She also had disease of the uterus. There are a great many ways in which cerebration indicates that the brain is influenced by the sexual organs, and such derangement of thought, shown by abnormal conversations, is often valuable in pointing to disease of the pelvic organs. Obscene or licentious mental expressions do not always indicate disease of the sexual organs. The demoralization of the insane may come from previous bad habits and associations, or may be developed by the disease of the nerve centres while the sexual organs are normal. Perverted thought when cut off from the control of the reason, may be made manifest while there is no physical signs of dis-

ease outside of the brain itself, but when deranged emotions manifested by obscene speech and actions are observed, in those previously modest and chaste, they should be taken as probable evidence of disease of the sexual organs, and should lead to further investigation.

Physical exploration of the pelvic organs of insane women has heretofore been beset with many difficulties. Indeed it has been impossible to examine some insane patients. Persuasion is often useless, and forcible efforts to control them ends mostly in defeating the examiner, or injuring the patient, or both. The only practical way has been to anæsthetize by ether, and this has proved to be very unsatisfactory. It is often a laborious task to give ether or chloroform to a maniac, to say nothing of the danger and injurious after-effects. With such past experience, we need not wonder that the practice of gynecology has found but little favor among those having the care of insane women. One has only to witness the distressing scene enacted in forcibly giving ether to a maniac, for the purpose of treating a uterine disease, to be satisfied that the results do not justify the means.

To overcome all these difficulties, I use the nitrous oxide gas as an anæsthetic, and I am happy to say that it answers the purpose admirably. It acts quickly and pleasantly, and has none of the choking effect, which is so distressing to those of sound mind, and peculiarly horrifying to the insane.

The mode of administering it is with the apparatus used by the dental surgeons, to whom we are greatly indebted for these valuable appliances. In place of using the mouthpiece, a rubber cap is employed, which fits over the patient's mouth and nose. The more manageable cases are placed upon the table, while the gas is administered. Refractory ones are placed in a chair, with a back high enough for the

head to rest against. An attendant on each side holds the arms ; the operator places the cup over the face, and holds it, while a third assistant holds the head steady between his hands and the back of the chair. A few inspirations are usually sufficient to quiet the most unruly patient, then the inhaling proceeds quietly until anæsthesia is complete.

By opening the valve so as to admit a portion of air, the effect can often be kept up without producing the arrest of blood aeration, which occurs in profound anæsthesia from this agent. It is well, if possible, to avoid this extreme anæsthesia, and the lividity which follows, because it changes the appearance of the tissues, and might thereby interfere with minute examination, especially if the examiner is unaccustomed to it.

So far as the observations of Dr. Shaw and Dr. Arnold of the Asylum have extended, no unpleasant effects have followed the use of this agent ; on the contrary, many of the cases who took it appeared to be improved in their mental condition. One young girl, who had been many months in the Asylum, and who spent most of her time in mental and physical inaction, asked for work to do, and became quite useful after having taking the gas a few times. The improvement could not have come from the treatment of her local derangement, because she did not improve in that respect. There is much reason for believing that the nitrous oxide gas is a valuable tonic in cases of extreme debility of the nervous system. Drs. Barker and Blake related some instructive cases bearing upon this subject in the N. Y. Obstetrical Society. Both these gentlemen employed the gas in such small doses as not to cause anæsthesia, and the effect was very satisfactory. I believe that further observation will show that like good will follow in some cases where it is given as an anæsthetic. If that should prove to be so on further observation, this agent will

exercise a double advantage. As it is, the use of it in the treatment of diseases of the sexual organs of insane women, is a contribution from gynecology to the management of the insane which promises to be of great benefit.

The physical signs of disease vary but little from those in ordinary cases, with a few exceptions which may be mentioned. The absence of tenderness is almost always marked. Patients rarely complain of being hurt by examination or treatment. This is so marked as to be noticeable in those who permit treatment without taking an anæsthetic. When the mental derangement has existed for several months or longer, and the menses have been absent, the vagina and cervix uteri are found to be pale and anæmic. The appearance resembles that found in those who have passed the menopause. This does not indicate any active disease, but simply shows the inactive condition of the circulation and nutrition. Constipation is so common among insane women as to make it almost the rule to find the rectum distended. This fact should be born in mind so that the bowels may be emptied before making an examination, thereby disposing of one of the chief obstacles to our investigations. The diagnosis of ovarian diseases— obscure at all times—is most difficult among the insane. It is well known how much dependence is placed upon the presence of tenderness on pressure in ascertaining the condition of the ovaries. This valuable sign is lost when we examine under an anæsthetic, and even when the patient is conscious, we cannot always tell by their behaviour, whether pressure hurts or not. Still in one case I was able to detect disease of the right ovary by observing that the organ was enlarged, prolapsed, and tender on strong pressure. There was also rigidity of the abdominal muscles on that side, which was marked compared with the left side.

Regarding the diseases which occur among the insane

there is little that is peculiar or worthy of notice. We find the same organic affections of the uterus and ovaries as are met among rational beings, and while their symptoms are modified by the state of the nervous system, their physical signs are the same. It is possible that malignant disease of the uterus occurs more frequently among the insane. There are reasons for believing also that the products of former diseases, such as puerperal metritis, pelvic peritonitis and cellulitis, are found more frequently among this class of patients than among sane women.

The treatment of diseases of the reproductive organs among insane women is based upon the general principles which guide us in ordinary practice. Indeed it may appear like presumption to offer any suggestion on this subject to those who are known to be familiar with uterine therapeutics. There are, however, circumstances peculiar to this class of patients which must, of necessity, modify our treatment, and therefore I will mention some points from clinical observation which may be worthy of notice. While discussing functional disease, such as amenorrhœa, it was claimed that constitutional treatment alone was required in such cases. That is doubtless true. Local treatment can accomplish very little to relieve such conditions, either among the insane or the sane. Persistent amenorrhœa seldom yields to local treatment, such as stem galvanic pessaries, the local use of electricity, leeching and blistering the uterus, and the difficulties in the way of employing such means among the insane, practically exclude their use.

In the management of cervical endometritis it is necessary to use means that do not require frequent repetition. On that account the hot water douche (a most valuable remedy) cannot be used, because these patients will not permit the nurse to treat them, nor will they use it themselves, except in rare cases. There is the same objection to the use of the

cotton and glycerine tampon, which requires to be renewed
every day. In such cases I have used with advantage an
application of equal parts of tinct. iodine and carbolic acid
once a week. This is sedative, and also changes the ab-
normal action of the mucous membrane, causing a diminu-
tion of the leucorrhœal discharge, the erosion of the sur-
face disappearing, not by being replaced by cicatrical tissue,
but by the restoration of normal epithelium. When im-
provement begins to appear it is well to lessen the propor-
tional quantity of the acid.

Vaginitis is also a difficult disease to treat among insane
women, owing to the same objections to the vaginal douche.
Little progress can be made in the management of this af-
fection without thorough cleanliness, and that is difficult
to obtain among insane patients. In fact vaginitis and vul-
vitis occur oftener in this class of patients than among
those of sound mind, owing apparently to want of care in
keeping the parts clean. Some of the most marked cases
of purulent vaginitis that have ever come under my obser-
vation were among my patients in the Asylum.

The treatment adopted in these cases consisted in first
cleansing the membrane thoroughly with a sponge, and then
applying a mild solution of nitrate of silver, or sulphate of
zinc with fluid ext. of hydrastis canadensis and water, and
then introducing a tampon of marine lint. This tampon is
changed for a new one every two or three days, until the
inflammation subsides. This is sufficient to cure most cases
of vaginitis without any other treatment. It separates the
inflamed surfaces, and by absorbing the secretions, keeps
the parts perfectly clean. The tar which it contains is one
of the most useful remedies in inflammations of mucous
membranes, and besides fulfills a modern demand in
surgery in being antiseptic. This method of treating
vaginitis has been tried in general practice and answers

well, but it is among the insane where its value is most marked.

Endometritis polyposa, or fungosa, with the menorrhagia which is caused thereby, is quite a common affection among the insane, judging from the number of cases which have come under my own observation. To meet the indications and the circumstances which the accompanying insanity gives rise to, I have adopted, with satisfactory results, the following method of treatment.

Having made a positive diagnosis, a small curette or scoop having a flexible stem, is carried into the cavity of the uterus, and the whole of the fungous material broken down and removed. This simple operation is often followed by complete recovery. Sometimes the polypoid growth returns and a repetition of the operation is necessary. In very few cases it has returned again and again, but has finally yielded to the use of bichloride of mercury given in the usual doses, and the application of tinct. iodine and carbolic acid after the use of the curette. There is nothing new in this method of treating the disease in question, except in omitting dilatation of the cervix by tents as a preliminary. This is entirely unnecessary and should be avoided, because it is painful and dangerous, while the use of the blunt scoop is less likely to give after-trouble than any other form of intrauterine treatment that I am familiar with. The methods of treating this affection given in our books are first to dilate, use the curette, and finally use some caustic or alterative application to the whole endometrium. This requires that the patient should be confined to bed several days, care being taken to prevent the development of inflammation ; and with all there is danger. Such practice is impossible among the insane. There are few of that class of patients that can be kept quiet in bed while undergoing such treatment. The same object can be obtained without interruping the pa

tient in her usual mode of life. I have used the curette in
office practice with as little caution as I make mild applica-
tions to the cervical canal, and have so far had no accidents.
In the confidence based upon that experience the treatment
was employed among the insane, and the results have been
quite satisfactory.

Laceration of the cervix uteri is now so well understood
by gynecologists that the treatment of it need only be men-
tioned in its relation to insane patients. The evil that such
lacerations give rise to are well enough known to warrant us
in saying that any patient with that complaint, whether sane
or insane, has a right to claim relief at the hands of the
gynecologist. The success of the operation depends to some
extent upon the details of after-treatment, such as rest in
bed and cleanliness. That is difficult to obtain among in-
sane women, but in lieu of that I have employed a method
of operating which gives fair results, even when the patient
goes around during the healing process, to wit : the use of
silk sutures and the lint tampon in place of the douch.

The advantage is that the sutures cannot wound the va-
ginia like the ends of a silver wire suture, and the tampon
supports the uterus and guards against putting a strain upon
the sutures when the patient moves or sits up. This method
is well adapted to practice among the insane. While I
would hesitate to operate in the usual way upon an insane
patient, I have practiced the method described with marked
success. A question may be raised as to the propriety of
leaving a silk suture in the cervix during the time requisite
for healing. The constant heat and moisture to which the
suture is exposed, certainly favors decomposition of the silk,
and if that should occur the suture would cause suppuration.
I have demonstrated that no such results need be feared
when the silk is properly prepared by immersing it for sev-
eral hours in a composition of melted wax, salicylic and car-

bolic acids.   During the past summer I removed such a su-
ture from the cervix that had been there for one year, two
months and twenty days.   The patient was operated up-
on, and when removing the sutures after union had taken
place, I carelessly missed one.   She soon became preg-
nant, and six weeks after confinement, she called for ex-
amination to ascertain the effect of delivery on the cervix,
and then I found the missing suture.   It had caused no
great trouble, and was in a very good state of preservation.

The pelvic pain or neuralgia, which arises from cicatrices
of the cervix and vagina, is often very annoying, and calls
for treatment.   Marked relief follows after dividing the
bands of cicatricial tissue.   In two insane cases I have now
in mind this treatment was the only means that could
easily be employed, and the results were very satisfactory.
One was a case of scar-tissue of the cervix from the reckless
use of nitrate of silver; the other had a number of cica-
tricial bands in the vagina resulting from gangrenous
vaginitis occurring after scarlatina in girlhood.

Displacement of the uterus, *i.e.*, prolapsus and versions
can be treated with good results, excepting when there is
anatomical or functional imperfections of the perinæum.
The displaced uterus can be readily restored and a pessary
adjusted while the patient is anæsthethized.   It is neces-
sary to frequently examine such cases while wearing pessa-
ries, because they may suffer without complaining.

The most important difficulty is encountered in the
management of displacements among those having imper-
fect perinei.   Pessaries or supporters held in place by being
fastened to the body cannot be used, and on that account
we are limited to intra-vaginal pessaries, which require the
presence of the perinæum.   To restore a lacerated peri-
næum would be easy, but to secure the after treatment
necessary to a good result is often impossible.   My own

investigation in this department has been very limited, but
I intend to try the use of the silk suture in perinæorraphy,
and see if union can be obtained. I am satisfied already
that in many cases the restlessness of such patients would
render the use of the silver wire unsatisfactory. One thing
is certain ; there is room for improvement in our methods
of restoring the perinæum among the insane. Attention
is called to this subject as a field inviting experimentation.
Flexion of the uterus, in its various forms, gives rise to
much suffering when the menstrual function continues, and
dysmenorrhœa is a common result. In quite a number of
patients with flexion there is amenorrhœa, and in such
flexion alone is presumed to give no trouble. There is
no reason for believing that a flexion unassociated with
any other disease of the uterus would give rise to disturb-
ance of the brain or nervous system in a patient who
does not menstruate ; so I have avoided local treatment,
believing that nothing would be gained by anything that
we could do. But when the menses recur, and are pain-
ful, the probabilities are that the flexion is the cause of
the dysmenorrhœa, and it should be relieved if possible.
Knowing how difficult flexions are to cure, when the cir-
cumstances are favorable, it need hardly be stated that
the treatment of such deformities among the insane is
often very unsatisfactory. The most daring gynecologist
would hesitate to use a stem pessary, or perform division
of the cervix in a patient who could not be well con-
trolled during the after-treatment. In flexion of the cer-
vix division might be practiced in patients not too vio-
lent and uncontrollable. As a rule, however, the treatment
in such cases is limited to subduing any excessive irrita-
bility of the uterus, and securing a sufficient size of the
canal by dilatation or incision, if necessary, and in cases of
forward flexion of the body, much might be gained by

straightening the uterus and keeping it so, as far as possible by means of Thomas' anteflexion pessary, or some like instrument.

There are forms of dysmenorrhœa (not dependent upon flexion of the uterus or any known mechanical cause) that are presumed to arise from ovarian disease, or some abnormal condition of the nerves supplying the sexual organs. In these cases the local signs are negative, and the only true evidence of the painful menstruation is the fact that the insanity is aggravated at that time, and the patient may indicate by the position of the body, and placing the hands over the lower portion of the abdomen, that the seat of suffering is in the pelvis. For cases of this kind I know of no special local treatment that is beneficial. Fortunately this form of dysmenorrhœa is rare among the insane. The reason for this is that the tender and irritable uterus and ovaries are relieved, in some cases at least, upon the appearance of insanity.

NOTE.—I would add that my thanks are due to my friend Dr. Alex. S. Clarke, for his constant and valuable aid in my practice among the insane.

PATHOLOGICO-CHEMICAL RESEARCHES IN CLINI-
CAL HEMATOLOGY.*

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PART I.—METHOD AND PROCEDURES EMPLOYED IN THE CHEMICAL ANALYSES.

1. THE HYDROSULPHITE OF SODIUM AND ITS PROPERTIES.

SCIENCE owes to my learned teacher, P. Shützenberger, Professor at the College of France, the discovery of a new substance which, in graduated solution, serves to measure the absorbent power of the blood for oxygen.† Schönbein had noticed that after putting sulphuric acid in contact with zinc it very quickly decolorized litmus or indigo, the solution taking a yellow color. It lost this property with the precipitation of sulphur. He put a wrong interpretation on this reaction, thinking it was due to the formation of ozone by the action of the sulphuric acid on the zinc. Indigo and litmus solutions are decolorized by both reducing and oxydizing agents; when acted upon by reducing agents they regain their color on exposure to the air as occurs in the present instance. Schönbein failed to

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* Translated by Dr. R. W. Amidon, from the author's manuscript.
  The article is so technical, and cases are given in such detail by the author, that only an abstract can be given in this Journal.

† *Annales de Chimie et de Physique*, t. xx. p. 351.

make this distinction and hence supposed the process one of oxidation.

That the effect is not due to the simultaneous action of sulphuric acid and the zinc is proven by the fact that the same reaction takes place in the filtered solution. No known compound of sulphur possesses the power of instantaneous decolorization, hence this must be a new compound. The duration of this decolorizing power is very brief, only lasting a few minutes, hence it is very hard to isolate the substance for use.

The hydrosulphite when isolated consists of a white powder which is slightly alterable in the air unless it be moist. It is very soluble in water, soluble in weak, insoluble in strong alcohol. The production of the new body Schützenberger expresses in the following formula:

$$3\left[S\left\{{O_2\ Na \atop O\ H}\right\}\right] + Zn = SO_3\ Zn + SO_3\ Na_2 + H_2O + S\left\{{O_2 \atop H}\right\}Na$$

Bisulphite of Sodium   Zinc.   Sulphite of Zinc.   Sulphite of Sodium   Hydrosulphite of Sodium.

He proves, by an electrolytic experiment that the hydrosulphite is formed by the action of nascent hydrogen on the bisulphite.

2. The apparatus for estimation * (Schützenberger, Risler, Quinquaud) is constructed with the idea of carrying on the analysis in an atmosphere of hydrogen, so as to prevent the absorption of the oxygen of the air by the hydrosulphite solution.

The solutions needed for estimation are, besides the hydrosulphite solution, an ammoniated solution of the sulphate of copper and a solution of red indigo.

The hydrosulphite solution is made by pouring a solution of bisulphite of sodium (35° Baumé) on 4-7 per cent. its weight of finely divided zinc, and agitating for 3-5 minutes. The clear fluid resulting is decanted, neutralized

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* Too complicated to be described here. [Translator.]

by lime water, which throws down the oxide of zinc, and filtered. The indigo solution is made by dissolving 200 grams of red indigo in 4 litres of water and put in a blue or black bottle.

The solution of ammoniated sulphate of copper is made by disolving 4.46 grams of pure crystallized sulphate of copper in a little less than a litre of water and completing the litre by the addition of ammonia.

The reducing power of the hydrosulphite solution is determined by its action on the copper solution.   10 c.c. of the copper solution is found to yield 1 c.c. of oxygen. Finding then the amount of a given hydrosulphite of sodium solution needed to decolorize 10 c.c. of copper solution will readily give the amount necessary to absorb 1 c.c. of oxygen.   Having determined this, it is easy to note exactly the decolorizing power of the hydrosulphite on the indigo solution.   Having ascertained these facts, estimation of the absorbent power of the blood for oxygen is conducted in the following manner.*

Introduce into a 1 litre glass jar, one-quarter full of boiling water, (the space above it being occupied by hydrogen gas) 50. c.c. of the indigo solution and 50 c.c. of water, holding in suspension 5 grams of kaolin, (to make minute changes in tint more easily observable). Then with a burette drop in the hydrosulphite solution until the indigo passes into a yellow. Now withdraw 2 or 3 c.c. of blood from a vein by a syringe and canula, shake it in a glass tube till it absorbs all the oxygen it can from the air and introduce that also into the closed flask.

The oxygen thus introduced will, of course, restore in part the color of the indigo and the amount of hydrosulphite needed, to decolorize it again will measure the amount of oxygen contained in the blood.

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*Schützenburger et Risler, *Comptes Rend.*, 12 Novembre, 1873 ; Quinquaud, *Bulletin de la Société Chimique*, 1873, p. 161.

By means of the amount of oxygen found in the blood, the quantity of hemoglobin can be easily calculated.

Thus we find, 1st, a progressive diminution in the percentage of hemoglobin present in the blood as we descend the animal scale.

2. The blood of young animals is less rich in hemoglobin than that of adults. In many species the placental blood contains less than that in the general circulation. A curve representing the amounts of hemoglobin present at different periods of life would descend slightly in the first days of extra-uterine life, ascend during childhood, remain stationary during adult life (25 to 50 years in man), and then fall gradually in old age.

3. The amount of hemoglobin in birds is much inferior to that in mammals, in the same quantity of blood, notwithstanding the fact that the weight of the globules is a little greater in birds.

4. In general, females have less hemoglobin than males.

5. The lymph of the crustacea contains 4–5 c.c. of oxygen per 100 c.c., while water, when saturated, contains 1 c.c. of oxygen per 100 c.c.

A robust man possesses 125–130 grams of hemoglobin per 1,000 c.c., while a worker indoors has but 116–120 grams. Out-of-door life for 4–5 months raises the amount 6–8 grams. People of southern possess less than those of northern countries. Scrofulous people have also a smaller amount. 116 grams in women is not of pathological import. In country people it is more abundant than in city people.

Certain occupations cause a non-pathological diminution of the amount of hemoglobin in the blood, viz., cooking, mining, furnace tending, etc. Pregnancy diminishes the amount to 106–110 grams.

In chlorosis and cancer there is destruction of the hemo-

globin. Chronic phthisis in its first and second stages lowers the percentage. Acute phthisis often reduces the amount of hemoglobin to 90, 85, or 80 grams. Typhoid fever lowers the percentage but little till the fifteenth day. This fact is of aid in the differential diagnosis between typhoid fever and acute phthisis. If the hemoglobine is reduced to 80 grams in 1,000 c.c. before the fifteenth day it is acute phthisis, if it remains above 100 grams it is a continued fever. In the same manner, where there is a doubt whether a woman is in the first stage of acute phthisis or is simply chlorotic, a reduction of the hemoglobin to 57 grams would point to the latter, while if it remained about 100 grams the existence of phthisis might be assumed. In the case of visceral tumors a lowering to 40 and even 38 grams would point to carcinoma while in ovarian cysts, fibroid tumors, etc., it seldom falls to 80 grams unless complicated by severe hemorrhages.

PART II.—THE ALTERATIONS OF THE BLOOD IN DISEASE. DIAGNOSTIC VALUE OF THIS LESION.

' (1) *a.* INANITION.

As typical cases there were selected insane patients who for from ten to fifteen days refused food. In the extreme cases there was considerable emaciation, cachexia and weakness obliging the patient to lie abed. The hemoglobin in these cases was but from 37.25 grams to 27.4 grams in amount. Upon the restoration of normal alimentation the amount of hemoglobin rapidly rose. Two young invalids having before, 31.52 grams of hemoglobin, had after six days feeding, 57 grams.

In cases fed by the œsophogeal tube the rise is not so marked, there being however in these cases a rise during twenty-five days from 41.66 grams to 52.08 grams.

In the anæmia of prisoners we find 76.5 grams of hemo-globin where we should find 129 grams, the oxygen is reduced from 240 to 147 c.c. per 1,000 grams of blood, and the solid ingredients are reduced from 90 grams to 77.75 grams per 1,000 grams of serum.

b CHLOROSIS.

In true chlorosis there is :

1st. A destruction of the crystallizable hemoglobin, which is found to exist in quantities of from 70 to 30 grams per 1,000.

2d. Chlorotic blood possesses an absorbent power for oxygen ranging from 69.9 c.c. per 1,000 grams of blood to 150 c.c., or an average of 104.9 c.c.

3d. The serum of the blood contains the normal amount of solid materials (about 92–94 grams per 1,000 c.c. of blood).

c. GRAVE ANÆMIA OR PROGRESSIVE, PERNICIOUS ANÆMIA.

In this malady, often of puerperal origin, the hemoglobin diminishes rapidly at the outset to 78.12 grams where no hemorrhages have taken place, and even to 41.66 grams where losses of blood have occurred. In fatal cases it may fall to 26.3 grams per 1,000.

The oxydizing power of the blood varies from 110–120 c.c., and in fatal cases may fall to 40 c.c.

Contrary to what is the case in chlorosis, the solid in-gredients of the blood are diminished in pernicious anæmia to 63.80 grams, or at the height of the disease to 55 grams per 1,000 c.c. In fatal cases it falls quickly to 58 grams and later in the disease to 40 grams. In giving a prognosis in a fatal case of progressive anæmia, I know of no more valuable clinical means than an exact chemical analysis of the blood. This diminution in the solid ingredients of the

blood explains the anasarca and puffiness which is seen in
certain patients with pernicious anæmia, and as long as this
remains we can say that the solid ingredients fall below
60 grams per 1,000 c.c. of blood serum.

d. GRAVE ANÆMIA OF PUERPERAL ORIGIN.

In mild cases of anæmia the hemoglobin falls to 80
grams, in moderate cases to 70 grams, in extreme cases to
50 grams per 1,000 c.c.   Corresponding lesions are noted in
the solid ingredients of the blood.

In slight hemorrhages, spontaneous or traumatic, the
hemoglobin ranges from 100.3 to 110.2 grams.   In larger
losses of blood it falls to 93.7 or even 87.8 grams, while
in severe hemorrhages it ranges from 26.3 to 66.3 grams.
The oxydizing power falls from 217 c.c. to 50 c.c., and the
amount of solid materials may diminish to 36 grams.

In purpura simplex the hemoglobin may reach 64.90
grams, while in scurvy it is 57 grams.   The absorbent
power for oxygen is about 129 c.c., while the minimum
amount of solid materials is 89 grams.

In purpura hemorrhagica the hemoglobin may descend
to 48.87 grams, or lower.   In two cases we have found
26.3 grams.   The absorbent power may reach 50 c.c., while
the solids may fall to 56 grams.

In scurvy the hemoglobin averages 60 grams, in fatal
cases may fall to 41.66 grams.   The absorbent power at
first is about 18 c.c., falling later to 11 c.c., or in profound
cases to 8 c.c.   The solids average 78 grams, may fall to
65 grams.

In hemorrhagic metritis the hemoglobin is 95.93, absorb-
ent power 190–180, and solid ingredients 88–85 grams.

In acute pneumonia at first hemoglobin is 111–93, ab-
sorbent power 230–180 c.c., and solid materials 82–76 grams.
In the febrile stage the hemoglobin is destroyed progress

ively till convalescence sets in. On the eleventh day
(fourth day of resolution) the hemoglobin is 86 grams,
oxydizing power 166 c.c., and solids 76 grams. Here they
remain stationary till the nineteenth day, when they in-
crease again.

In typhoid pneumonia of septic origin we have hemo-
globin 70 grams, absorbent power 130 c.c., and solid ma-
terials 75 grams.

In acute pleurisy before exudation, hemoglobin 125–109
grams, absorbent power 21 c.c., solids 80 grams.

In the period of exudation hemoglobin 83 grams, absorb-
ent power 19–16 c.c., solids 76–74 grams.

In sub-acute and chronic pleurisy the hemoglobin is 109
to 93 grams, absorbent power 21–18 c.c., and solids 85–80
grams.

In pyothorax the hemoglobin is 52 grams, absorbent
power 10 or 8 c.c., and solids 60–55 grams. Thoracentesis
diminishes the amount of hemoglobin, the absorbent power
and the solid ingredients to a marked degree.

Acute peritonitis at first has the same variations as acute
pleurisy. In the height of the disease the hemoglobin is
98 grams, the absorbent power 190 c.c., the solid materials
82 grams. In prolonged cases the hemoglobin may reach
72 grams, the absorbent power fall to between 170 and
140 c.c., while in severe traumatic peritonitis with abundant
and rapid exudation it may be even 120 c.c. The solids are
78–74 grams. In parenchymatous nephritis the hemoglobin
is 88 to 93 grams, the solids 60–55 grams, and absorbent
power 170–190 c.c. In interstitial nephritis the hemoglobin
falls to 75 grams, sometimes to 67 grams, the absorbent
power is between 145 and 130 c.c., and the solids fall to 80,
later even to 74 grams. In atrophic cirrhosis of the liver
the hemoglobin is 67 grams, the respiratory power remains
at 130 c.c., while the solids drop to 80 grams.

THE HYSTERICAL ELEMENT IN ORTHOPÆDIC SURGERY.*

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WE will now consider neuromimesis of hip-joint disease.

CASE 4.—Fanny A. is 15 years old, and lives in New York.

Hereditary history.—Father an epileptic ; is an inmate of the Blackwell's Island Hospital for Epileptics, and "is fast becoming an idiot." Mother is healthy ; the patient has one brother who is well ; no sisters.

Patient is a plump girl ; has a clear skin, and is not anæmic ; is an inmate of a Home for Friendless Girls, and applied for relief at the Orthopædic Dispensary Aug. 3, 1875, accompanied by the matron of the Home. Six months previously, while in domestic service which required much running up and down stairs, she was attacked by a severe pain in the knee of the right leg, attended by a very perceptible limp. The pain soon involved the hip-joint, and finally the back. The pain was frequently urgent at night, and "the leg was drawn up and in " both night and day. There was no history of any direct injury to the affected limb or joint.

The patient applied at the dispensary during my summer vacation, and the following notes were made in the record book by the assistant surgeon who received the case :

" Condition of limb, adducted and slightly flexed ; muscular

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* Read before the New York Neurological Society, December 1, 1879.

rigidity and pain at thigh and knee ; flattening of natis and alter-
ation of gluteo-femoral crease.   Pressure through trochanters
gives pain ; motion in any direction, especially adduction and ab-
duction is resisted and gives pain.   Pain on going up and down
stairs ; pain at night ; limps badly ; slight concussion to heel
causes apparently severe pain.   Menstruation regular and normal.
General condition of patient seems excellent ; she came into the
room bearing almost her entire weight upon the arm of her at-
tendant."

A diagnosis of hip disease was made by the assistant surgeon,
and a note to that effect was sent to the managers of the
" Home."

On August 16, 1876, the hip splint was applied.   On the 20th
the following record was made in the history book :

" Relieved of pain ; walks very nicely with the splint."

August 28th.—" Muscular rigidity still well marked."

September 11th.—" Doing well."   September 15th.—" Exam-
ined to-day very carefully by the surgeon in charge, and hysterical
symptoms established beyond doubt.   Splint and appurtenances
removed and patient ordered to walk home."

" The following conditions were present during the examination :
Patient, under the instructions of the operator, voluntarily flexed,
extended, abducted and adducted the limb normally.   She re-
sisted at first, but gradually yielded and permitted the operator to
place the limb in the extreme positions mentioned above, includ-
ing also all degrees of rotation and circumduction.   Pain only on
pressure over anterior superior spine and above crest of ilium.
The patient walked away without apparatus, and with slight limp."
No special treatment was adopted. She was ordered to use passive
movements, a tonic was prescribed, and the case was kept under
observation.   On October 1st of the same year she went to Hast-
ings-on-the-Hudson to fill the position of a domestic, wholly cured,
and there was no return of the trouble even after the hard work
incidental to her duties.   She called at the dispensary during the
past summer (1879) to consult me regarding a pain in the back,
which proved to be a localized hyperæsthesia—a condition which
did not exist during the previous treatment of her case.   She told
me that her limbs were equally strong, and that the ailing hip had
given her no pain or uneasiness for many months.

Remarks.—The symptoms in this case were well calcu-
lated to deceive, and had the patient been " coached " by

an expert they could scarcely have been more closely simulated; and yet this girl had never seen a case of hip-joint disease, and knew no more of its symptoms than does a child of three years. If further confirmation was needed to sustain the correctness of the diagnosis, note the effect of the extension apparatus: "Relieved of pain, and walks very nicely with splint,"—its almost invariable effect in true, chronic coxitis. There was no disturbance of uterine function, no symptoms of spinal irritation, no hysterical convulsions, no particular emotional disturbance; but there was an indescribable something about the patient as she walked into the dispensary with the apparatus applied—as I first saw her—which suggested neuromimesis. There was the absence of the relation of cause and effect regarding her attitude and other expressions of her condition: a voluntary, and therefore irregular, effort to accommodate the one to the other, characteristic of the false as distinguished from the real disease, and the result of the examination fully confirmed my suspicion. The differential diagnosis turned principally on two points, viz.: the absence of the expressive atrophy of the thigh muscles and the absence of the *persistent character* of the reflex muscular spasm, which is an invariable symptom of chronic osteitis of the hip-joint. It was in this case that I first tested the thigh muscles with the faradic current, and found, as I have previously stated, a normal contractility.

It is worth while to call attention to the fact that in some cases of neuromimesis, as in this, the patient will express himself as greatly, perhaps almost wholly relieved after apparatus is applied; others wear their pads and straps so very tight that excoriations result, and insist that the appliances fail to give them comfort unless so worn—ignoring excoriations and other inconveniences which, in the true disease, often cause great uneasiness.

In other cases the apparatus is soon discarded, having produced no other effect than the trouble incident to its use, leaving the patient, apparently, much worse than when it was put on. I draw no distinction as to which class re-covers the more quickly ; the one just detailed made an exceptionally rapid recovery. I have now a case under ob-servation, which was referred to by my friend, Dr. T. G. Thomas, where everything which could be suggested by the most eminent medical talent in the city was carried out in the treatment of a recognized hysterical paralysis of the right lower extremity, with only partial success. With ap-paratus the patient is now comfortable, and walks much better than before its use ; but the question of complete recovery is one which the future only can decide.

CASE 5.—Miss E. O., aged 20, residence, Greenpoint, New York, applied for treatment at Orthopædic Dispensary, September 29, 1875.

The patient's parents are living and in good health ; has two brothers and two sisters, all in good health, except one sister younger than herself, who has suffered from chronic, suppura-tive hip disease for eight years, and who has been under the im-mediate care of the dispensary for several years. There is, apparently, a good family history with this exception, and no dis-ease of the nervous system is known in previous generations.

The patient has always been "a delicate girl." Menses first appeared at 14—very irregularly at first, but recently a great im-provement has taken place in this respect. Is in apparently good physical condition, though somewhat pale.

Last winter (1874), she fell while stepping from a street car, and "hurt her hip," beside "cutting her elbow and knee." The pa-tient walked home, however, with a decided limp. Soon after she "wrenched her hip" badly while rolling a barrel of flour. This last accident proved more serious than the former, the patient be-ing unable to walk after the second injury to the joint. She was carried into the house and placed in bed, from which she did not move for three days. During this time she suffered much pain in and about the hip, and after again assuming the upright position she walked with "a bad limp," and required assistance in going

up and down stairs for several weeks. In the following spring (March) " pain in the back " appeared as an urgent symptom, the pain being located over sacro-iliac junction. The lameness and the pain were treated at home without success. In April she was seized with what the family physician called " neuralgia of the spine," and soon after hysterical convulsions appeared. Consultations were held, and " heart disease " and " tumor in the groin " were diagnosed. In this condition she went to Connecticut to visit a frient. While there she again " sprained her hip." This third injury to the hip joint was followed by an increase of the limping, pain in the back, hip and knee, and very restless nights. She returned to New York on September 25th, the symptoms being much aggravated by the journey. The pain in the knee became worse, sleep was very irregular and greatly disturbed, " the limb began to draw up," and the knee rested against the opposite thigh. Crutches were obtained, and with their use and the assistance of her mother the patient presented herself for examination.

I was about leaving the dispensary when the patient appeared. Having an engagement, I did not stop to make a careful examination, but taking into consideration her marked expressions of pain, both facial and oral, as I moved the limb while the patient stood before me upon crutches, her attitude, the rapidly repeated history of traumatism, and the apparent extreme disability and muscular rigidity of the hip joint and especially remembering that the patient's sister was under my care for morbus coxarius, I directed the house surgeon, Dr. George B. Packard, to apply a weight and pulley if manual traction should afford relief. The examination of the house surgeon is thus recorded :

" Patient pale and with anxious countenance ; limps very badly ; a great deal of hyperæsthesia of back, especially in lumbar region ; vertebral column very flexible ; no prominence visible ; great tenderness in inguinal region ; excruciating pain and apparent reflex contraction on movement of joint ; flexion and adduction of thigh ; flattening of natis ; gluteo-femoral crease lower and larger. *Traction relieves pain.* Patient entered ward, and weight and pulley applied."

October 1st.—" Relieved a little, but does not sleep well. Order-ed morph. sulph. gr. ¼ at night. Does not get much relief from pulley ; complains of pain in each hip. The symptoms are those of hysterical hip disease, and a diagnosis to this effect was made by the surgeon-in-charge."

October 8th,—" Ordered a few drops of tint. of cinchona bark as a substitute for the ¼ gr. dose of morphine. The effect was the same as though morphine had been given. The condition is un-mistakably a hysterical one, and patient was ordered to get out of bed and to attempt to walk. She walked with great difficulty, using a chair in place of crutches. The hip symptoms have sub-sided entirely, and are now centered in the knee joint, which has been held in extreme extension by the weight and pulley."

October 20th.—" Discharged in the following condition : Hip symptoms wholly removed, but the knee is held firmly fixed in the position it may happen to assume after manipulation. Consider-able pain in the knee, and patient walking very badly."

December 2, 1876.—" The mother called to-day to report, and says she ' is sure the doctors dislocated the knee joint while the patient was in the ward.' This ' dislocation ' was reduced in the following manner : ' While rubbing the joint with a liniment, something suddenly snapped, and the following morning the pa-tient could walk as well as ever before.' "

April 10, 1877.—" The patient called at the dispensary to-day with her sister's hip splint, which needed repairs. She walks per-fectly well. Sleeps well ' with valerian once in a while.' Has pain in hip and knee during easterly storms and after very long walks. No difference in size or length of limbs."

Remarks.—All the symptoms in this case were very ur-gent, and I have never seen a closer imitation of the real disease. These symptoms were developed in a tolerably well-nourished girl, who had been the personal attendant of her afflicted sister for several years. This sister had passed through all the stages of a chronic, suppurative coxitis. The mimicry in this case is undoubted. The dread of the disease, of which she daily saw a very painful example, was suffi-cient, in her extremely sensitive condition, to develop the train of symptoms described, and which, at my first and su-perficial examination, deceived me. But when I again ex-

amined the patient, after the weight and pulley had been applied for two days, I found much the same condition of affairs as has been described in Case 4. When the first attempt to flex the thigh was made, the patient being in the supine position, an exaggerated expression of pain followed that would be difficult to describe, and the pelvis moved with the thigh as though an actual anchylosis existed at the hip joint. Next I held the pelvis firmly, and strove to overcome the flexion. The pelvis tilted forward, and the tubera ischii, resting on the mattress underneath, became the fulcra by which the lumbo-dorsal spine was alternately lordosed or kyphosed. Abduction of the thigh was next tested. But the pelvis moved with the femur upon the opposite acetabulum at the expense of the vertebral column. But I became convinced from various over-expressions of pain and exaggerated statements as to the effect of some simple tests, coupled with the history of hysterical convulsions, that a neuromimesis of hip disease was present. While the patient was looking in another direction, I made a persistent, but not forcible flexion, and after a few seconds of determined resistance the joint suddenly yielded. So it proved regarding the other movements, until, after a time, free passive motion of the articulation was permitted without pain.

The patient was in bed. Buck's extension was applied to the limb, and the question arose: What shall be done? It was deemed best to continue the traction for a few days. This was done, and the patient then was *permitted* to get up. As mentioned in the notes, all the hip symptoms disappeared under this treatment, and the trouble concentrated about the knee joint; and this complication did not yield prior to the discharge of the patient. The manner in which recovery was effected is very suggestive of the methods employed by the professional " bone-setters."

CASE 6. Charlotte K., aged 12 : admitted to St. Luke's Hospital, May 13, 1879.

A portion of my own notes of this case have been mislaid and I am indebted to my friend, Dr. Robert Abbe for the following memoranda made by him when the patient entered the hospital.

Patient enters hospital in excellent general condition but complaining of much pain about the right hip on walking or sitting down. She has a marked limp and drops on that side when walking ; she gives a history of having been injured on that side eight years ago, with pains and limping ever since. On examination there is :

1. Shortening three-eighths of an inch by measurement of limbs.

2. Atrophy of solid tissues, the right thigh and calf being one-fourth inch less in circumference than the left.

3. The natal fold on the right side is higher and deeper—the buttock slightly flattened.

4. The inguinal fold is drawn up on the right side and the genital fissure considerably drawn to the affected side.

5. Pain about the inguinal region and iliac fossa ; likewise pain in pinching up the skin anywhere on either thigh or leg.

6. Some adduction and a little flexion of thigh on abdomen.

7. The patient refuses to flex thigh on abdomen when lying down, or to allow much flexion of it.

8. There is rigidity of all the muscles of the affected thigh.

Points on which an exclusive diagnosis was made.

1. The emotional element in the child ; easily affected to tears, without pain. She seemed also very conscious of observation and suspicious of it.

2. The rigidity of muscles of thigh is variable, as when attention is directed thereto or diverted therefrom, etc.

3. The flexion of thigh which occurs when patient sits in a chair cannot be obtained when she lies down.

4. Patient can put on her own shoes and stockings.

5. She attributes disease to and dates back her trouble from an injury eight years ago.

6. There is more or less hyperæsthetic pain at most any point of opposite leg, or any part of body when pinched or touched.

7.   Uniform temperature ; no evidence of suppuration ; good appetite ; good general condition.

8.   Psoas muscle was not involved in the contraction.

In a letter recently received from Dr. Abbe, he also says:

" The child, when not conscious of observation was occasionally seen when playing with other children, to jump down from buttress of the front steps of the hospital—a distance of three feet, and to run off without evidence of pain.   She was also, on one occasion, taken off her guard by an offer of money with which to buy peanuts from a passing vendor and momentarily developed an unexpected freedom of action about the hip joint."

This case came into my service at the hospital with a diagnosis of hip joint disease, and Dr. Abbe has described symptoms upon which such a diagnosis might easily be made, but the condition of the patient and the elements of the exclusive diagnosis are so plainly stated in the notes that extended comment seems unnecessary.   In this as in the preceding case, the extremely variable character of the muscular contraction was the turning point in diagnosis ; a wide difference existed between the symptoms developed at the formal examination and those shown by the patient when she thought herself unobserved.

I may mention one other point which would be of value were the elements of diagnosis more confusing ; *i.e.*, the atrophy.   It was the same at both leg and thigh.   In true joint disease of several years' standing, the atrophy of the thigh is far in excess of that of the leg.   I have made and recorded several hundred observations on this point and find such to be uniformly the case.   The shortening of three-eights of an inch was undoubtedly congenital.   This patient recovered under the treatment pursued in the other cases reported, and left the hospital in a few weeks.

CASE 7.   D. P., æt. 10.   Residence, N. Y. State.
This patient applied to me on September 10, 1876, suffering

from all the important and many of the urgent symptoms of hip disease—left side. The hereditary history, as related by her mother, was not very satisfactory. as nothing definite could be learned, other than the fact that the child's father was dead, and that " all the rest of the family were healthy."

The symptoms from which the patient suffered had been of insidious growth. She first commenced to limp, shortly after an injury to the hip. The limp had been followed by pain, though, the mother states that the pain followed so soon, as to be almost coincidental with the limping. The pain was in the thigh, knee and hip, the patient passed through some sleepless nights, and gradually the limb had become " very weak and deformed." The limp and pain became so much worse that crutches were used. The patient used these crutches as she came into my office—with a diagnosis of hip disease, and a letter of introduction from a prominent surgeon of one of the Hudson River counties.

It was with great difficulty that the patient was pursuaded to lie down upon a lounge for examination. After many efforts and a great many suggestions from the mother, the patient was finally placed in the supine position, the mother, in the mean time, making what seemed to be manual traction with a degree of force that indicated long practice. The patient, all this time, was shrieking with pain, and grasping the furniture near at hand, apparently as a means of counter-traction. I imagined that the case was one of chronic osteitis of the hip joint, in the stage of exacerbation. After much persuasion I, at last, induced the mother to permit me to make the traction and control the limb. I then commenced to gently test the condition of the joint, as regards motion. While manipulating in the mildest manner, I was startled by an urgent cry from the patient, and an imperative command, " hold it tighter," two or three times repeated. I was already making all the traction possible, and naturally asked an explanation. The mother hurriedly said " you don't squeeze the ankle tightly enough." This threw a new light on the symptoms. Desisting wholly from all efforts at traction, I merely compressed the ankle joint with all my power. While doing this I could place the thigh in any position, and could even press the articular surfaces together without resistance or complaint.

Still " squeezing the ankle," I was able to get the patient in the upright position with little or no trouble. Without any support but that afforded by her crutches, the thigh became flexed and ad-

ducted. The whole limb was visibly, though not markedly atro-
phied. There were various hyperæsthetic areas on the affected
limb—principally on the inner aspect of the thigh—and over the
crest of the ilium. Pain was produced by pressure through the
trochanters, by crowding the sacro-iliac surfaces together, and by
digital compression in the inguinal region. The patient stated
absolutely that she could not walk without support. There was
normal faradic contractility of the leg and thigh muscles.

I informed the mother that her child did not have hip
disease—and advised the same course of treatment that had
been successfully pursued in other cases. My diagnosis was
not well received. The mother openly declared that she
preferred Dr. ——'s opinion to my own.

I had almost forgotten about the case when, one day, in
passing through my ward at St. Luke's, I again met my
former patient, still upon crutches, and still suffering from
" hip disease,"—under which diagnosis she entered the hos-
pital. It seems that the mother of the patient had wholly
disregaded my advice, and had consulted a prominent
surgeon of this city, who, after a careful examination, had
diagonized coxitis, and had said I " had made a great
error." The especial attention of the house staff was called
to the patient and my friend, Dr. G. A. Spalding made the
following notes of the case, which he has kindly given me.

1. Patient entered hospital on October 30, 1876, using crutches,
and refusing to stand upon, or use her left limb, in any way.

2. Thigh flexed and adducted. The attitude and position of
limb were characteristic of hip disease.

3. Very marked expression of pain on passive motion of joint
—principally at the knee.

4. Joint motion limited in every direction at first. It became
almost normal when persistent effort was made while patient's at-
tention was diverted. Apparent atrophy of thigh and leg muscles.

5. Patient very restless at night. She had used morphine
prior to entrance to hospital.

6. When patient was under observation she complained much
more than when she imagined herself unobserved.

7. *Traction relieved pain*, and apparently rendered patient more comfortable.

The peculiarity manifested when I first examined the limb, viz.: the preference for a squeezing sensation at the ankle had become greatly modified. The patient was now relieved by direct traction only.

The treatment pursued consisted in the removal of the crutches, passive movements, with cod liver oil and ferruginous tonics. She improved very rapidly and on December 20, 1876, she left the hospital without any evidences of hip disease. The subsequent career of this patient is thus described by Dr. Spalding in a letter to me :

" On Feb. 19, 1877, about two months after her discharge, her mother again presented the patient for admission to the hospital, giving the following history : A few weeks previous she had been seized with convulsions. These convulsions, the mother stated, were becoming more and more frequent and alarming—as many as three or four occurring in twenty-four hours. As the mother gave this history, she was occupied in unrolling a large bundle, which proved to be a blanket. This she spread carefully upon the floor, remarking that the hour for one of these attacks had arrived, and that it was her custom to put the blanket down as a protective. Precisely at 11 o'clock A. M. the patient composed herself comfortably upon the blanket, and passed into one of the most characteristic hysterical convulsions I have ever witnessed. The subsequent history is very brief and most satisfactory. The usual remedies lessened the frequency and shortened the duration of these attacks. But an absolute cure was not affected until later. I chanced to be in the ward one day at the time the patient was seized with a convulsion, and happening to see a siphon of carbonic acid water, I picked it up and holding the young girl firmly by the back hair I discharged the contents of the siphon down her throat. Her convulsive movements were instantly checked, and she promised to avoid all such conduct in the future. She kept her word, and in a few weeks was discharged from the hospital. During all this time the patient had no recurrence of the hip joint manifestations."

Remarks.—The hysterical diathesis was well demonstrated

in this case, as Dr. Spalding's experience proves ; and my own experience shows, as I have remarked in other cases, that a diagnosis of " hysteria," be it qualified by ever so many Greek names, is very apt to produce a not very pleasant impression, so far as the patient and her friends are concerned.

We observe also in this case the change in the symptoms, as relating to traction of the joint. When I first examined the patient, I explained to the mother, in presence of the child, that in true joint disease traction afforded relief, and that simply " squeezing of the limb " would not produce any effect upon true joint symptoms. When the patient entered St. Luke's she was fully prepared upon this point, and I have no doubt that this information assisted in deceiving the next examiner.

We are assisted in our study of knee joint lesions by many favoring circumstances. We can detect by inspection alone any considerable change in the outline of the articulation. We can discover, oftentimes without the thermometer, a rise of temperature, due to intra-articular changes. Palpation is of great service, and the appearance of the superficial tissues is frequently of material assistance. But in considering the differential diagnosis of hip joint lesions in the first stage, we cannot rely with the same certainty upon any one of these diagnostic aids. Inspection shows us a flattened natis, a deformed position, an altered gluteo-femoral crease, etc., all of which may arise from a variety of causes. The surface thermometer is rarely of service. The joint is too remote from the surface to make palpation available, in the first stage of the disease, in the great majority of cases, and the appearance of the superficial tissues is not of special diagnostic value. Our means of objective diagnosis are therefore limited at the hip, and we are obliged to depend upon a closer analysis of the symptoms, especially the subjective.

Bearing these facts in mind, and recalling the essential points developed in our study of the true and false lesions of the knee, especially as applied to chronic osteitis and neuromimesis, we may summarize our observations upon these same points as applied to the hip as follows :

In chronic osteitis of the hip * there exists, among others, the following symptoms :

1. *A limp*, which forms in the large percentage of cases the first symptom noticed,—a limp which is not expressive of fatigue,—which is more apparent after rest than after exercise, and which usually increases until the patient is unable to bear any weight upon the affected joint.

2. *Pain.* This symptom rarely antedates the limp, but may appear simultaneously. Generally it follows the limp after many weeks, sometimes months. The pain is usually referred to the knee, and is very frequently described as presenting at some point remote from the hip.

3. *A state of apprehension* regarding joint movements, difficult to describe. This apprehensive state always attends the pain, and frequently antedates its oral expression. It is almost invariably developed by passive motion if pushed beyond the point of muscular resistance, and is plainly demonstrated by some particular form of forcible movement—by concussion in some, by quickly rotating the thigh in others, etc.

4. *Muscular spasm.* This exists always as a symptom of chronic osteitis of the hip joint, though its existence might easily be overlooked in the early stage of the disease by a careless observer. In this early stage, the one most likely to be confounded with neuromimesis, this spasm of

* Chronic synovitis of the hip joint, is, probably, of rare occurrence, and is not easily diagnosed. See the author's Clinical Lecture on the " Etiology and Pathology of Chronic Joint Disease," pp. 18 and 34, and remarks in " Pott's Disease, Its Pathology and Mechanical Treatment," by the author, p. 25 et seq. See also remarks by V. P. Gibney, M.D., in Article, " Dislocation of the Hip in Children."—*Amer. Jour. Med. Sciences*, Oct., 1879.

the muscle is perceptible in the extremes of flexion and extension, and it is especially noticeable when, with the patient in the prone position and the pelvis firmly held, the flexed leg is used as the long arm of a lever to make rotation of the thigh *outward.* This muscular spasm increases, as a rule, with the limp, but many months, or even years, may pass before it reaches the point where all movement of the joint is arrested ; and cases may occur where the spasm simulates actual anchylosis, and yet there may be a very slight limp only, and no oral expression of pain.

5. *A progressive muscular atrophy* of the muscles thus affected as shown, as has been already mentioned, by comparative measurements and the electrical test.

It will not be necessary to mention further points. They have been fully considered and discussed in our consideration of the knee joint conditions.

In the neuromimesis of hip disease these symptoms present the following phases :

1. The limp is variable and suggests fatigue. The expressive conservative element so apparent in hip disease is lacking. This variable, tired limping is, as a rule, much better after rest, and is often absent in the morning after sleep. It almost invariably follows the pain, though in Case 7 it did not.

2. Pain is usually the first symptom, and it is found most generally in the immediate region of the joint—for example, over the iliac crest, or anterior superior spine. The hyperæsthetic character of this pain is easily demonstrated, as a rule.

3. In place of an apprehensive state, in response to the tests applied, will be found a series of symptoms which are erratic and inconstant.

4. A condition of muscular rigidity often exists, but, unlike the true muscular spasm, it can, in most cases, be overcome in the manner before stated.

5. A very perceptible degree of atrophy may exist, such however, as would, arise from inertia only. A normal elec- trical contractility exists in all the muscles of the thigh.

The conclusions reached in our study of the knee joint lesions apply with equal force to the hip joint, local tem- perature alone excepted.

Cases sometimes occur where actual hip joint symptoms exist, associated with undoubted hysterical manifestations. If the former are not urgent, and the latter very evident, the difficulty of making a correct diagnosis is very great. The danger lies in ignoring the obscure, but real, and at- taching a too great importance to the false. Such a case occurred in my own experience, and may be briefly related.

Case 8.—Miss A. S., a young lady residing in Brooklyn, of healthy parentage and with a good early history, passed through the ordinary symptoms of the first stage of hip disease, and came under my care in 1875. After a thorough mechanical treatment, covering about one year, all the symptoms of the joint lesion sub- sided, and in consultation with the family physician, Dr. A. W. Catlin, it was decided to remove the splint. This was done, and the patient walked without any limp, except that which would be expected from the disuse and confinement of the limb.

Soon after the removal of the splint, however, various typical hysterical symptoms manifested themselves, and hyperæsthetic areas developed in various portions of the affected limb, and espe- cially over the crest of the ilium, the lumbar spine, the sacro-iliac synchondroses, and the outer portion of the thigh. There were other symptoms, also hysterical, which developed at the knee joint, and the emotional condition of the patient became very ap- parent. All of these pointed to a neuromimetic state. While in this condition, which existed for some weeks, the patient began to limp slightly, but the joint motions were, as before, nearly normal. The involuntary symptoms, especially the nocturnal ones, were absent. The fact that there was a slight decrease in the re- sistance to joint motion as the limp still became more apparent, was noted. Still the limp increased, and so did the emotional symptoms. The limp became still more pronounced, but the other joint symptoms did not keep pace with the debility of the limb, while the hysterical were very prominent. This condition

remained for a time, when the apparent urgency of some of the subjective symptoms led me to suspect that the emotional symptoms were secondary to a relapse or coincidental with it, I asked Dr. E. C. Seguin to see the patient, and in a consultation, at which Dr. A. W. Catlin was present, it was decided that the symptoms warranted protection to the joint. Accordingly, the splint was again applied, with relief to all the symptoms, the hysterical as well as those which were, as the result proved, real, for the formation of an abscess at the end of about six months proved the correctness of Dr. Seguin's opinion. The case has done well ever since.

The insidious progress of caries sicca of the articulations in the first stage, might easily suggest neuromimesis, or some other lesion of the nervous system, as it did in the case which Esmarch reports, and to which reference has already been made. In caries sicca of the hip joint there exists, when the disease first manifests itself, a limp, which is so slight as to be scarcely noted,—very slight resistance to extreme joint movements, and an indefinite expression of pain; sometimes no oral expression of pain at all. After these symptoms have existed for a time, they may wholly disappear for several weeks. When they again return, they are a little worse, and generally follow some slight twist or injury to the joint. A total remission of the symptoms may occur several times. In the child these symptoms are generally referred to "growing pains," "habit," etc., and in the adult it has frequently been called "rheumatism," "sciatica," "hysteria," or even in one case "malaria." I could relate many cases of this character did space permit. I can only refer in these general terms to this, the serious side of the question, for the error of diagnosing a joint lesion, when a neuromimesis exists, is as nothing compared with the evil consequences, the deformity, and death, which have resulted from mistaking a progressive and serious hip joint lesion for "sciatica" or "rheumatism."

[TO BE CONTINUED.]

A POSTURAL METHOD OF COPULATION FOR THE CURE OF SOME FORMS OF STERILITY IN THE FEMALE.

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OBSTETRIC SURGEON TO MATERNITY HOSPITAL, VISITING PHYSICIAN TO
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TO ST. FRANCIS AND CHARITY HOSPITALS.

STERILITY from time immemorial, has been a subject which has interested—and perplexed the minds of philosophers, divines and physicians. So deeply has it concerned the domestic, social, and legal status of the race, that its effects have not only sown discords in families, but influenced the fate of nations.

Affecting as it does the laws of inheritance, wars have been waged, and crimes committed, that have revolutionized society, prevented justice, and changed the apparent destiny of the world.

The perversion of no other human functions has been as powerful as this for good or evil to mankind. Nevertheless, its consideration by experimenters has even in our time been the occasion of severe reproof from reviewers and critics.

Until pathology revealed its many causes and inductively suggested the remedies, its treatment was confined to the prayers and anathemas of the church, or to such crude

suggestions as priests and philosophers could give, drawn from analogically observing the menstrual and procreative arts in the lesser animals, and based upon the merest shadow of physiological guessing.

Gynæcological studies, however, have changed all this, so that sterility is now only a condition, with remedies as various as its causes, and its cures, the application of simple physiological rules, and chemical or mechanical contrivances.

Notwithstanding our enlightenment, it is the experience of all who are dealing with this subject that the condition is still extremely frequent and unwilling of relief from two very natural causes, namely, physical fear of operative interference, and womanly modesty that holds sacred the act which makes her a wife, and which is performed in the presence of no other than her husband.

It is with a view of considering and respecting this sentiment, and at the same time substituting for surgical relief a method of restoring, when possible, the mechanical relations of the male and female organs in copulation to a basis recognized as necessary to insemination and fecundation, that the following cases are related :

Mrs. McK, aged 30, had been married four years. She came to me for the treatment of two distressing conditions, which were the cause of a great deal of unhappiness to herself and husband, namely, pain during intercourse, and sterility. She gave a history of perfect health, every function being normally performed, and her appearance was that of a handsome, vigorous woman. Previous to her marriage she was a schoolteacher, and in answer to my enquiry as to her personal cognizance of a sexual existence at this time, stated that she was possessed of a decidedly erotic temperament, and was desirous of marriage.

Her disappointment was pronounced when, after marriage, she discovered that the conjugal act was accompanied with such horrid pain. And ever since it has been so distressing that she has only submitted to it under protest.

This condition had annoyed her husband, who had fancied that her repugnance to the act was the result of a loss or transference of her proper affection. He was desirous of children, and provoked to find his wife sterile.

Her history had nothing of interest except as above stated. Physical examination of the sexual organs revealed a perfectly normal appearing vulva, but upon attempting to introduce my finger into the vagina, she shrank from me, and exclaimed, " There is all my trouble." Upon close inspection I discovered the carunculæ myrtiformes exquisitely sensitive and tender, indeed the least touch was exceedingly painful. Here, no doubt, was the seat and cause of her vaginismus. I persisted in my examination, notwithstanding her suffering, and found the vulvo-vaginal orifice amply distensible. She said intercourse had been complete ; this was, no doubt, the case, as there was no physical obstruction whatever to the introduction of my two fingers. I noticed however upon thus entering the vagina, that it was thrown into a state of alternate contractions and relaxations, the pelvis flexing, and the uterus apparently descending to repel my finger. The whole generative tract seemed to be thrown into a violent state of repulsion to the intrusion. It was not a vaginismus in the sense of a tonic spasm ; on the contrary, there were spasms of a clonic character, which more nearly resembled an orgasm.

The case so far was exceedingly interesting to me, as I had never seen exactly this form of reflex action before. The uterus was normal and *in situ*. There was nothing wrong discoverable except this hyperæsthetic condition of the remains of the hymen, and this, no doubt, was the cause of her intolerable pain upon intercourse, and perhaps the indirect cause of her sterility ; for although intercourse was complete, as attested by the well-worn, dilated vagina, still I believed that the frantic, expulsive efforts of the genital tract which I had witnessed, were quite sufficient to discharge the seminal fluid from the vagina almost immediately upon its deposit, thus preventing it from remaining long enough for the spermatozoa to get a lodgment in the uterine cavity.

As a curative measure I advised her to let me operate, by trimming out the diseased remains of the hymen, and I told her I could almost promise her relief from pain upon intercourse, and insure her fecundation. She said she would submit the proposition to her husband, and return and let me know the answer.

In the course of a few weeks she returned, and said her hus-

band would not permit an operation until all other resources
failed, and begged me to suggest something else.

I told her my plan in that event was to get her pregnant in some
way, and then probably the act of parturition would cure the va-
ginismus, as it had done before in my experience. In furtherance
of this plan I instructed her to have intercourse with her hips ele-
vated upon a high pillow, and that immediately upon the with-
drawal of the penile organ she should clap a napkin to the vulva
and hold it there firmly as long as possible, and not move from
the recumbent position with her hips highly elevated for four
hours, or longer if possible. This she promised faithfully to
do, and in the course of three weeks came to me and told me
she had missed her period, and from the unusual symptoms
which she had noticed, believed she was pregnant.

The belief was correct, and the cure of all her troubles has
been complete.

My idea of the cause of the sterility in this case was
that the inpinging of the penile organ against the hyper-
æsthetic remains of the hymen was not sufficient to pre-
vent the ingress of the organ, but calculated to excite such
reflex actions in the muscular accessories of the generative
tract as to cause expulsion and discharge of the semen from
the vagina. The plan of cure was, that by placing the pa-
tient in the position described, with her hips highly elevated,
so as to flex the pelvis upon the body, I got the benefit of
all that gravity could afford in retaining the semen, and, by
closing the vulvo-vaginal orifice by the application of the
napkin, I impeded the exit of *some* spermatozoa that might
possibly be thus directed to their natural office.

CASE 2.—Mrs. C.. æt. 30, had been the mother of three chil-
dren, and lost them by death.

She had not been pregnant in eight years, and was exceedingly
anxious to have another child.

She had been everywhere for treatment but without avail. She
gave the history of perfect health. She was a tall, well-propor-
tioned, handsome woman, and was not conscious of ever having
had any trouble more than headache, and this she attributed to

some vague uterine cause, which was also the cause of her sterility. Upon examination of the sexual organs I found a wide, gaping vulvo-vaginal orifice, associated with a cystocele and rectocele, the result of a perineum worn out by her three parturitions. The walls of the vagina were normal, except that they were relaxed, and led up in a funnel-shaped way to the uterus. The cervix uteri had been lacerated, and its everted edges cicatrized by applications of different chemicals, which had, no doubt, been honestly applied in the vain hope of curing her by some of her former medical attendants. The uterus otherwise seemed normal and but slightly prolapsed, considering the condition of the lacerated perineum and weak vaginal walls.

I told her what I had found, and proposed operating for the restoration of the perineum and the closure of the lacerated cervix, hoping by thus reducing the regions to their normal calibre and shape, that she might conceive. This she positively refused, and said the same had been advised by others, but she would not submit to it.

I then told her I could suggest a plan which she might try, and perhaps it would result in her becoming pregnant. This was that she should have intercourse with her hips well elevated upon a pillow, and that she should not remove from that position through the night. I gave her no other instructions nor treatment. She promised to obey implicitly, and left my office.

She returned in two months in great happiness to tell me she was pregnant, and wishing me to attend her in confinement. This I could not engage to do, as she lived remote from my residence, but she has completed her utero-gestation most satisfactorily.

My theory of the cause of sterility in this case was that the funnel-shaped vagina, with the yawning vulvo-vaginal orifice, had no retentive power whatever, and that, coupled with the cicatricial character of the cervical and intra-cervical region of the uterus, the spermatozoa, unless injected directly into the uterus, might readily drain away before they could get a foothold, as it were. By directing intercourse with the patient in the recumbent position, with the hips so elevated that the seminal fluid could not run out, and thus retaining it *in situ* over the cervical canal, fecunda-

tion was effected, and a sterility which had lasted for eight years overcome.

CASE 3.—Mrs. M., æt. 26, came to me complaining of vague uterine symptoms, which she said had been present ever since the birth of her child, six years previously. She had never been quite well since the birth of that child, but was exceedingly anxious to be cured, so that she could again become pregnant. She had been treated by several physicians, who had failed to relieve her. There was nothing in her history of any marked or original clinical importance. She had always been in pretty fair health, with no menstrual disorder, except slight pain. She was unable now to take long walks, and was subject to pain in her back and leucorrhœa. Her great desire was to bear a child, and to this end she had worn pessaries, and submitted to applications of one sort or another, always to her hurt, as she thought.

Upon examination I found a very well preserved perineum, the vulvo-vaginal orifice well closed, but immediately within the vagina the sensation was cave-like to the exploratory finger. It was expanded everywhere, and the end of the finger infringed upon a huge vault of the roof of the vagina. This was due to a retroversion that had been accompanied at some time by adhesions of an inflammatory origin, so that the organ was dragged somewhat upward as well as backward. The cervix was well up toward the anterior vaginal wall, wholly out of its normal axis.

I endeavored to replace the organ by placing the patient on her elbows and knees, and manipulation. I could only replace it partially, and that with some considerable pain to her. Still I could tilt it up sufficiently in this position to markedly change its axis. There was no laceration of the cervix other than what is physiological to the parous woman.

I proposed a pessary, which she submitted to reluctantly, as she said they always hurt her and had to be removed. This was her experience with me also, as she could not wear any device I adopted. I treated her with the hot douche locally, and by every hygienic and remedial measure I could invent endeavored to get the organ tolerant of support, so that I could bring the cervix and os uteri back to the normal relations with the posterior *cul-de-sac*, the reservoir where nature expects the seminal deposit, under certain conditions, in some quantity. My efforts were unavailing, and then it occurred to me that I had better reverse my therapeutical methods, and make a pregnancy cure the cause of sterility—the retroversion.

To this end, I recommended what I had remembered having read somewhere in a book written by priestly orders, of connection with the woman in the position *à la vache*, for the overcoming of sterility. It seemed to me that with the woman placed in this position, the uterus would antevert sufficiently by gravity alone to permit the seminal fluid to be thrown upon the os and cervix in coitu. My theory was, that as connection was generally performed, in this case, the seminal fluid would be thrown away back beyond the cervix into the cavernous expansion representing the *cul-de-sac*. There was no possibility with the semen thus directed and deposited, of the spermatozoa reaching the os, with the cervix tilted up in this direction, within a short time, and that therefore they might be killed in the too acid fluids of the vagina, if they were acid, a condition, however, I did not chemically test. I therefore directed that she should have intercourse only in the breast-elbow position, and to remain in this position as long as she possibly could after coition—that is, until she was fatigued. I saw nothing of her for three months, when she returned to my office and told me the device had been successful, and that she was pregnant. The pregnancy was completed in parturition.

It is unnecessary to enumerate the causes and curative procedures of sterility in this connection, as they are generally well-known and recorded. It is sufficient to state the fact that in many instances the causes are obscure and undiscoverable, or may be so near the surface, as in the case related, as to be overlooked and ignored. This we do know, that every woman who menstruates is liable to become fecundated under conditions, and the main essential condition is that the spermatozoa shall be placed in such a position that they may reach the ovum.

That they may reach the ovum requires generally that they shall be deposited in, or in the neighborhood of, the os or cervix uteri.

It is agreed that unless they are deposited in this situation, there are many chemical and physical reasons why they may perish before they gain entrance to the uterus and ovum.

The methods of all experimenters in artificial fecundation are based upon this necessity, viz., the application of the semen to the os uteri. Their methods are so repugnant, however, upon the grounds of decency, that they can have no practical or hopeful application.

Sims, Pajot, Courty, Eustache and others have all succeeded in effecting fecundation artificially, by the aid of the syringe, condom-finger, and so forth, but each method requires the personal presence of a third party, a physician, or a skilled art in manipulation not to be expected in a husband. It is not strange under these circumstances, and the additional fact that the women are fortunately rare, who will so sink their self-respect as to submit to such treatment, that these methods of cure are looked upon as simply physiological curiosities or eccentricities, not to be suggested even until all else fails and the desire for maternity overcomes every other womanly instinct.

If there is any way of substituting a method whereby we may avoid a professional intrusion upon the conjugal act, or by it do away with surgical operative interference, it is well for us to adopt it.

Perhaps the cases related are of interest in demonstrating what may be called the *Postural Method* of copulation in the cure of some forms of these distressing and interesting cases. Certainly its performance is open to none of the disagreeable objections which the former methods imply, and it would seem to invite further trial from the successes related above.

By this method the semen can be placed in contact with the canal of the cervix by simply adapting the act of copulation in such a way that gravity alone may correct certain physical deformities which change the normal axes of the receptive organs of the female, and thereby direct the seminal fluid to its proper site, and retain it there until sufficient time shall have elapsed for it to complete its function.

THE TEMPERATURE IN URÆMIA.

BY T. A. McBRIDE, M.D.

THE temperature in uræmia seems to have attracted but little attention until the appearance, in 1872, of Bourneville's " Études Clinique et Thermométriques sur les Maladies du Systéme Nerveux ; Deuxième partie—Urémie et Éclampsie l'uerpérale." In this ·monograph the following conclusions were submitted :

1. From the first one observes a falling of the temperature in uræmia, and in puerperal eclampsia an elevation.

2. In the course of uræmia the temperature steadily falls ; in puerperal eclampsia the temperature rises with great rapidity, and continues to rise to the termination of the seizures.

3. The difference in the course of the temperature is especially marked in the cases which terminate fatally. In uræmia the temperature falls very low, as low possibly as 28.1° C. (82.58° F.) ; in puerperal eclampsia it may rise very high, even to 43° C. (109.9° F.).

From these conclusions it is evident that Bourneville did not regard puerperal convulsions as uræmic. But it is now generally accepted that convulsions in puerperal women are, as a rule, uræmic, and in fact the cases of puerperal convulsions which Bourneville records in his monograph had all had some form of renal inflammation or degenera-

tion, as evidenced in most of the cases by autopsies, and during life by albuminous urine, œdema and other symptoms. We may conclude then that in some cases of uræmia an elevated temperature will be found, and that in other cases a low temperature will be observed. The questions then naturally occur, what are the clinical forms or varieties of uræmia in which high or low temperatures are usually found, and, moreover, can any explanations be offered for some of the abnormal variations of temperature which have been recorded in certain cases of uræmia?

I think that something may be done in the way of answering these questions, and I propose to submit certain cases of uræmia, as pure and uncomplicated as is possible, where high temperatures have been observed, then to briefly review the cases on which Bourneville has based his conclusions of a low temperature in uræmia; and then to call attention specially to those cases of uræmia in which I believe a low temperature will be found, and, lastly, to point out what conditions and circumstances materially influence the course of temperature downward.

CASE 1.—Service of Dr. Woolsey Johnson, New York Hospital; reported by Dr. Royal Amidon, late House Physician. Male, æt. 42. Admitted with pain and swelling of right knee; pain in back; frequent micturition; slight fever; temp. 38.2° C. (100.75° F.); urine contains albumen, pus, renal epithelium, and hyaline and granular casts. Pain and swelling of knee and fever disappeared under sodium salicylate in two days. On third day, at 1 P.M., attacked with clonic convulsions and coma. By 6 P.M. patient had three more convulsions, and an axillary temperature of 40.6° C. (105° F.). Death ensued the next day, the temperature still continuing elevated. Temperature nine hours after death in the left ventricle was 37.6° C. (99.6° F.).

Autopsy.—A congested œdematous brain, fatty heart, fatty liver, and cirrhotic and cystic kidneys; other organs normal.

CASE 2.—Service of Dr. Whitall, Colored Home; reported by Dr. R. G. Wiener, late House Physician. S. H., æt. 23. Coma

with convulsions on admission. Temperature was taken in the mouth :

May 28, A.M.—T. 38.4° C. (101° F.); P.M.—T. 38.8° C. (101.8° F.)
 " 29, " T. 37.2° C. (99° F.); " T. 40° C. (104° F.)
 " 30, " T. 38.7° C. (101.6° F.); " T. 39.4° C. (103° F.)
 " 31, " T. 38.7° C. (101.6° F.); " T. 38.8° C. (101.8° F.)
Died in coma. Urine contained fifteen per cent. of albumen.
Autopsy.—Small granular kidneys ; all other organs normal.

In this connection I present the following quotation from Bartels :

" I will not omit to state here that with the exception of one single instance (*vide* Case 8), in every case of uræmic convulsions which I have seen, the temperature of the body, taken directly after the first attack, has been considerably elevated above the normal, being raised in two examples to 40.6° C. (105.1° F.), and remaining thus abnormally high for some time, occasionally for days, when the convulsive attacks rapidly succeeded each other. These observations are opposed to the statements of Bourneville and Hérieux, who claim that they observed a lowering rather than an elevation of the temperature of the body in uræmic convulsions. At all events, the temperature of the body deserves far more attention than it has generally hitherto received. It is possible that through investigation in this direction some important light may be thrown upon the nature and cause of uræmia. I cannot think that the abnormal temperature which I observed could have resulted merely from the violent muscular exertions during the fits ; it is the less likely because heat was maintained generally for hours beyond the duration of the actual spasms." *

In Case 8, to which Bartels alludes in the above, there was repeated vomiting, and he says that " it was remarkable that on an average it (the temperature) marked a

* Amer. Ed. Ziemssen Cyclopædia, vol. xv. Diseases of the Kidney. By Prof. Carl Bartels, p. 146.

half to a whole degree (Centigrade) higher on the days
when there was no vomiting." *   Besides the vomiting,
there were repeated hæmorrhages from the rectum, and also
oozing of blood from the gums, and both the vomiting and
the hæmorrhages may have been sufficient to have account-
ed for the absence of elevation of temperature in this par-
ticular case.†

Here also may be submitted the conclusions of Adolph
Strumpell,‡ which were derived from the study of fifty cases
of uræmia.

The temperature is not much elevated in slight uræmia,
but when there are chills and sweats one often finds a con-
siderable elevation of temperature, as much as 41.5° C.
(106.7° F.).   In fatal cases there is often a very great eleva-
vation of temperature, and more rarely, a decided fall of
temperature.

I think that we must admit, on the above showing, that
in many cases of uræmia a high temperature is often ob-
served.   Leaving this part of the subject for the while, I
pass on to the review of the cases on which Bourneville has
based his inductions, and for convenience sake I have tabu-
lated these :

I have placed in this table only those cases which have
been reported at length in his monograph.   Cases referred to
incidentally have not been recorded, since they could not
be obtained sufficiently complete.   There are ten cases, and
I shall reject Case 9, since there is no evidence in the his-
tory that the patient had any renal disease, but was said to
have with convulsions cerebral tumors, and the case was
classed as uræmic from the fact that a diminution in the

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* Loc. cit., p. 158.

† Wunderlich, Medical Thermometry. New Sydenham Society, Edition 1871,
pp. 134, 154, 182.

‡ Bemerkungen über die Uræmie und ihren Einfluss auf die Körpertemp-
eratur. *Arch. d. Heilk.*, xvii, p. 36 (*Revue des Sciences Médicales*, tome viii,
1 Fascicule, p. 178).

BOURNEVILLE'S CASES OF URÆMIA WITH LOW TEMPERATURE.

CASE	AGE	VARIETY	MODIFYING CIRCUMSTANCES	URINE	TEMPERATURE	PREVIOUS HISTORY	POST-MORTEM	
1	36	Convulsions and Coma.	Obstinate vomiting and diarrhœa.	Suppression of urine.	36.4° C (97.52° F.)		Cirrhotic kidneys.	Case reported by Roberts in *Lancet*, 1870, vol. 1, p. 868.
2	59	Somnolency.	Emaciation, vomiting.	Suppression of urine.	Axillary 36.33° C. (97.39° F.)	Permanent obstruction of one ureter by a calculus in 1864 and of the other in 1868.	Pyelo-nephritis of right kidney, pyonephrosis of left kidney.	Case reported by Hutchinson in *Am. Jour. Med. Sci.* 1870 No. cxix, p. 154.
3	40	Insomnia, intelligence intact.	Obstinate vomiting.	Suppression of urine.	Axillary 34.44° C. (93.99° F.) to 36.° C. (96.8° F.)		Stricture of urethra, abscess of prostate, chronic nephritis.	
4	18	Adynamic. No coma or convulsions.	Obstinate vomiting.	No mention whether there was suppression of urine when uremic symptoms appeared.	Rectal 35.8° C. (96.44° F.) just before death.	Incomplete luxation of vertebral column. Retention of urine.	Pyelo-nephritis and cystitis.	
5	43	Coma.	Previous history of dysentery.	Small amount passed.	Rectal 30.1° C. (86.18° F.) Five minutes after death 28.40 C. (83.5° F.)	No history given of vomiting or of diarrhœa while under observation; but p. m. appearances suggest that they may have occurred. Died one day after admission.	Stomach contains many ecchymoses; upper part of small intestine congested; kidneys small and cystic.	
6	67	Coma.	Great œdema of lower extremities. Diarrhœa 24 hours after admission.	No suppression but quantity small.	Rectal 33.7° C. (92.66° F.) to 32.6° C. (90.68° F.)	Died one day after admission to hospital. No previous history.	Kidneys, chronic diffuse nephritis. No mention made of examination of alimentary canal.	
7	14	Coma and convulsions.	Emaciated.	No suppression but quanity small.	Rectal 35.4° C. (95.7° F.)	Two months before admission attacked with "*eruption rubeolique*," and was confined to bed for many days with it. Had great thirst and hunger then. Urine did not contain sugar. Died 4 days after admission.	Kidneys small, and granular, lungs and meninges congested. No mention made of condition of other organs.	
8	75	Coma.		No suppression.	Rectal 35.°C (96.° F.) to 30.3° C. (86.54° F.)	Feet and hands violaceous; bluish macules on legs and arms; much pericardial pain.	General pericardial adhesions. Kidneys, chronic diffuse nephritis.	
9	49	Convulsions.		No suppression.	Rectal 34.4° C. (93.92° F.) to 33.9° C. (93.03° F.) with diminution of urea; at death temperature arose to 39.4° C. (102 92° F.)	A case of cerebral tumor. No symptoms or history of renal disease. Urine contained no albumen.	No post-mortem made.	
10	51	Coma and delirium.	General anasarca. Vomiting.	No suppression.	33.2° C. (91.76° F.)	History of alcoholic excess.	Effusion in left pleura; miliary tubercles in lungs; congestion and thickening of mucous membrane of stomach. Kidneys, chronic diffuse nephritis.	

amount of urea excreted was observed during the convulsions, and this I think insufficient evidence for its being classed with the other cases.

Of the remaining cases, Nos. 2 and 4 were suffering from pyelo-nephritis, and No. 3 from kidney disease, apparently resulting from stricture of the urethra, with abscess of the prostate as a complication.

I am inclined to the belief that in those cases of renal disease which are secondary to obstruction of the ureters, or to diseases of the bladder and urethra, and especially in those where there is complete suppression of the urine, a low temperature during uræmic attacks will be, as a rule, observed.   As somewhat confirmative of this opinion, I submit the following cases :

Case 1.   Serious uræmic symptoms resembling the algide stage of cholera ; increasing fall of temperature in rectum to 33.5°C. (92.30° F.).   Post-mortem : Retention of decomposed urine in bladder ; ureters dilated ; renal sclerosis.*

Case 2. Cancer of the uterus ; profound cachexia ; uræmic coma ; temperature in rectum, 39° C. (102.2° F.).   Post-mortem : Compression and obliteration of ureters, which are distended, as are also the pelves of the kidneys.

Case 3. Suppurative pyelo-nephritis ; inflammation of the ureters ; cystitis ; uræmic coma ; rectal temperature, 33° C. (91.4° F.) ; somnolency, coma and death.†

In Case 2, just given, it should be remembered that in the cancerous cachexia a low temperature is, as a rule, observed, and that that condition may possibly have been a factor in the causation of the very low temperature.

In the Cases 2, 3 and 4 of Bourneville, which I have just reviewed, obstinate vomiting was a prominent clinical feature, as it is often when there is suppression of urine.

*MM. Béhier and H. Lionille.—*Bull. de la Société Anat.*, 5e série, t. viii, p. 56.

† M. Bourneville, vid. sup. p. 51.

In Case 1 of the table, obstinate vomiting and diarrhœa are recorded, and likewise suppression of urine.

In Case 5 the patient died twenty-four hours after admission, and there had been a previous history of intestinal trouble ; and although no mention of vomiting or diarrhœa is made in the history, the post-mortem appearances show that such symptoms might have been present.

In Case 6 the patient was 67 years of age ; there was great œdema of the lower extremities ; the patient died one day after admission, and had some diarrhœa while in the hospital, and no mention is made of any examination of the alimentary canal post-mortem.

In Case 8 the patient was 75 years of age, and had extensive pericardial adhesions ; was very cachectic ; feet and hands were violaceous, and legs and arms were covered with bluish macules.

In Case 10 the patient was 51 years of age ; had been given to alcoholic excesses ; there had been obstinate vomiting, general anasarca and effusion into the left pleura.

In all of these cases there were present certain conditions which might account for the low temperature observed, and these I have tabulated as follows :

1. Excessive vomiting. Cases 1, 2, 3, 4 and 10.
2. Diarrhœa. Cases 1, 5 (?), 6.
3. Dropsy. Cases 6 and 10.
4. Heart disease—pericardial adhesions. Case 8.
5. Old age. Case 6, 8.
6. Inanition—alcoholism and cachexia. Case 10.

It is well known that excessive vomiting and diarrhœa will lower the temperature, and this especially is so in conditions of inanition, when collapse temperatures are often observed. Wunderlich, p. 428, and, Hirtz, *Chaleur dans les maladies. Nouveau Dictionnaire de médecine et de chirurgie practiques*, p. 794.

In general anasarca, or where there is a large effusion of serum, as in ascites or hydrothorax, a low temperature is found. Hirtz *loc. cit.*

In disorders of the circulation in organic diseases of the heart, before even cyanosis, œdema or asytolism is present, the temperature may be quite low. Hirtz *loc. cit.*

In old age, as is well known, it is common to find in various diseases the temperature .5° C. (.9° F.) to 1° C. (1.8° F.) lower than in the young and middle-aged. Wunderlich *Medical Thermometry*, p. 184.

Again, "aged men are much disposed (incliniren) to collapse-temperatures, and in them these often sink to a very low level." Wunderlich, p. 210.

In regard to Case 8 of Bourneville's, Charcot states that in certain cases of disease in old people there is a decided fall of the central temperature, " *   *   *   nous pouvons citer comme examples certaines affections du cœur, la péricardite, les gangrènes séniles, le marasme et diverses formes de cancer." *Leçons clinique sur les maladies des vieullards et des maladies chronique.* Paris, 1874, p. 36, *et vid*, pp. 288–291.

Wunderlich, in regard to inanition, says : "Inasmuch as inanition is so commonly both a sequel and a concomitant of very many chronic diseases, the course of the temperature may be modified by it in very many ways. Not only does it very frequently depress the temperature persistently, and sometimes also without any recognizable reason depress it even to the extent of collapse, but in conditions of inanition any considerable or external cooling of the body, deprivations of nourishment, muscular exertions, perspiration, vomiting or diarrhœa and losses of blood generally have a very unequal (ungleich) effect in considerably lowering the temperature, because the diminished production of heat in these cases is no longer able

to compensate and conceal the loss of warmth." pp. 427 and 428.

In chronic alcoholism a lower temperature is often seen, and collapse-temperatures are observed in certain diseases attacking persons in this condition. Wunderlich, p. 137, also Hirtz, *loc. cit.*

Case 7 seems to be the one case in which no other explanation can be offered for the low temperature except the uræmia, but there is a history of some eruptive disease two months before, which kept the patient in bed for days, and it is stated that he was emaciated. His condition was probably one of inanition, and the temperature in this case cannot be accepted unreservedly.

It is remarkable that if we now examine the cases of puerperal eclampsia, which Bourneville reports in this monograph, and which cases be it remembered, are cases of uræmia, that we find in not one of these cases any of the conditions present, which have been brought forward as possibly explaining the occurrence of the low temperature in the tabulated cases. I think then it is permitted for us to question the conclusion that in all forms of uræmia a low temperature is present. More observations must be made before the temperature curve in uræmia will be known. My belief is that we shall find the temperature high in some cases and low in others. It is probable that in the following a low temperature will be observed :

1. In cases of renal disease secondary to diseases of the urinary tract, especially when accompanied by complete suppression of urine.

2. In uræmia occurring in the aged.

3. In uræmia occurring in the course of very chronic renal disease, in which there may be vomiting, diarrhœa, or hæmorrhages.

4. In uræmia, in the cancerous cachexia, and, possibly, in marasmic conditions.

It is necessary, in order that the observations have any value, that they should be made with great care, and that the temperature should always be taken in the rectum. I believe that low axillary temperatures will be found in chronic Bright's disease, often when a normal rectal temperature will be registered. It is also important that the conditions which are known to affect temperature, such as vomiting, diarrhœa, hæmorrhage, intercurrent inflammations, should be noted when observations are made.

I regret that this paper should be only critical and suggestive, but in endeavoring to collect material on which some conclusions as to temperature could be based, I have been surprised at how few observations were to be found. The researches of Charcot and Bourneville on the temperature of cerebral hæmorrhage and softening have proved so valuable, and have been confirmed so often, that it is to be hoped before long that the thermometry of uræmia may be established, and be of no uncertain aid in the differential diagnosis of those difficult clinical problems, coma and convulsions.

THE INTRA–BUCCAL METHOD OF FARADIZING THE LOWER FACIAL MUSCLES.

By E. C. SEGUIN, M.D.

IN the last two or three years I have used a ready method of applying electricity to the lower facial muscles, which has not, I believe, been generally known or employed. The method is based upon several facts: (1) that the inferior facial muscles present well-defined motor points upon the buccal mucous membrane; (2) owing to the constant moisture of the mucous membrane, the application of a strong current is well borne; (3) that, in consequence, a better contraction is obtained by a given strength of current applied in this way, than when it is applied percutaneously.

It would be tiresome to enumerate the muscles which can thus be made to contract in a most complete way; suffice it to say, that all the muscles below the malar bones and the nose can thus be reached. A good reaction of the masseters may be obtained.

The instrument which I employ is figured in the annexed wood-cut. It consists of an ordinary interrupting handle, armed with a rod-like electrode of moderate length (10 cm. or more), bent at right angles near its extremity, and terminating in a ball 5 mm. in diameter. The whole of the rod or stem, except the ball, should be completely insulated.

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The indifferent electrode (sponge) may be placed in one of the patient's hands, upon the back of his neck, or over the trunk of the facial nerve.

The same special electrode will serve to make applications to the pharyngeal and palatal muscles.

By this method I have been able, in the stage of re-covery of rheumatic facial paralysis, to obtain distinct contractions with faradism, when the strongest currents which could be tolerated on the skin of the face did not produce them.

EDITORIAL DEPARTMENT.

MR. LISTER'S ANTISEPTIC METHOD.

Nine years have passed since Mr. Lister began to use the spray engine and carbolized gauze in the dressing of surgical wounds and injuries. For several years previous to 1871 he had been experimenting with carbolic acid in surgical dressings, but the introduction of his method, as it stands, dates from that year. The story of its fortunes must be familiar to all. Like other surgical novelties, it found some ready and even eager to test it, some disposed to deny the correctness of the principles upon which it is based, and many, whose enthusiasm had been chilled by frequent disappointments, simply indifferent to its unverified claims. This period of indifference or mild interest did not last long. Isolated reports of remarkable successes obtained by its aid appeared in the journals; hostile criticism, which in some cases seemed to have its origin in personal rivalry and competition, stimulated inquiry; and towards the end of the year 1872, a German surgeon who was on the point of closing his wards on account of the frightful mortality in them from pyæmia and erysipelas, determined as a last resource to give the method a trial. His success with it was immediate and unquestionable. During the fifteen months following its adoption 716 patients were received into the hospital, and 4,000 treated as "out-door" patients; among these, traumatic erysipelas occured eight times, pyæmia three times, and septicæmia once under the Lister dressing; there was not a single

case of acute diffuse phlegmon or purulent œdema ; thirty-one cases of compound fracture of the limbs were treated conservatively without a single death, whereas previously, twelve out of sixteen such injuries to the leg treated by the open method had terminated fatally.

Similar testimony came from other quarters, and in 1876 the general belief in the value of the method and the recognition of the merit of its originator, were shown in his selection as President of the Surgical section of the Medical Congress which met in Philadelphia that year. In 1877, he was called to London and appointed Surgeon Extraordinary to the Queen, and Professor of Surgery at King's College, taking the place made vacant by the death of Sir William Fergusson.

With general interest in the method came general discussion of its details and the causes of its success. Modifications of all kinds were introduced ; by some as avowed partisans, by others who accepted its central idea but thought many of its minutiæ unnecessary ; and by some, less generously perhaps, to approximate it to older methods and show that its good results were due to causes not suspected by the author. Borax, salicylic acid, thymol, were in turn substituted for carbolic acid, washing of the wound with a strong solution at the end of an operation was made to do duty for the use of the spray during it, lint wet with carbolized oil took the place of the gauze, and the simple addition of daily washings with carbolic acid was claimed by some to be all that was necessary to make an old method equal to the new.

A new term corresponding to the new method made its appearance in surgical literature. The followers of Mr. Lister saw in putrefaction the source of all preventable surgical complications, and their effort therefore was to prevent putrefaction. Theirs was *antiseptic surgery*. Against this restriction of the term many have protested, and Mr. Savory in his brilliant address before the British Medical Association last summer, regretted the confusion in the current employment of the phrase. According to his view, all surgery is antiseptic which aims to secure speedy repair and healthiness of wounds " by the most scrupulous cleanliness, not

only in the common, but in the surgical sense, which means the prevention or removal or destruction of all matter which may prove poisonous." As thus understood, he says, the term is simply equivalent to "good surgery," and is therefore superfluous. Upon this point we venture to differ from him. Antiseptic surgery, as generally understood, aims at the absolute prevention of putrefaction, not at the mere removal of its products ; and although Mr. Savory's surgery may be as "good" as Mr. Lister's, we certainly need a term to distinguish between the widely different methods by which the respective results are obtained, and what term can be more appropriate than the one which indicates the principle involved.

The question of the comparative excellence of the results has been warmly debated, and Mr. Lister's opponents have found a formidable argument in the fact that his statistics have not hitherto been published. To the report of remarkable cases, of new operations successfully carried out, they reply that statements of this kind have never been wanting in favor of any novelty ; and Mr. Bryant, referring to this, has said somewhat harshly that "the publication of isolated cases, however good, proves nothing, whereas the withholding of the whole suggests much." To published German statistics English surgeons have replied that the results could be considered good only by comparison with the inexcusably bad ones previously obtained in the same hospitals, and that they were actually much inferior to those obtained by themselves by other methods.

In support of this statement, Mr. Savory presented in the address above referred to, a tabulated report of the cases of bloodpoisoning that had followed injury or operation, during a period of three years at St. Bartholomew's Hospital. We condense the tables as follows :

	Total Cases.	Percentage of Deaths.	Pyæmia.		Erysipelas.		Percentage of Blood-poisoning.	
			Cases	Deaths	Cases	Deaths	Cases	Deaths
INJURY . .	2862	7.47	6	6	22	4	1.05	0.42
OPERATION	1235	5.82	11	10	38	8	3.96	1.44

All the operations included in these tables, he says, were of some magnitude ; most of them were capital ones ; trivial operations and those for hernia, ovariotomy, and on the eye, were for obvious reasons excluded.

While Mr. Savory and his three colleagues differed in regard to certain details of treatment, they were entirely in accord as to the chief objects in view. " Cleanliness in the surgical sense, and rest in the physiological sense, may be said to be the leading aims." They watch the actual condition of the wound very carefully, and use freely antiseptics of various kinds. Constant attention is paid to keeping the air of the wards pure and free from any suspicious odor ; they avoid any tendency to overcrowding of wounds in a ward, and, finally, they attach the highest importance to the condition of the patient before operation. Mr. Savory's own practice, as illustrated in the amputation of a breast or of a limb, is as follows : All hemorrhage is carefully arrested, usually with the carbolized cat-gut ligature ; blood clots are removed from the surface of the wound by means of clean water or sponges just rinsed out of it ; the edges are brought together with silk sutures placed at intervals of one or two inches. If the patient is old, in poor condition, or fat, and · there is reason to anticipate free discharge, he inserts one or two thin strips of gutta percha or threads of cat-gut into the wound. Then a layer of lint soaked in oil containing two per cent. of carbolic acid is placed over the wound ; over that again two or more layers of dry lint, with or without cotton wool, so arranged as to secure by gentle and equable pressure accurate coaptation of the cut surfaces, and made fast by strapping or bandages so placed that they can be removed with the least disturbance. Usually this dressing is not disturbed for forty-eight hours. If, on examination, the wound is found in a satisfactory condition, the dressing is repeated as before ; if there is any evidence of retention of the discharges, he relieves it by carefully separating the edges of the wound with a clean probe, or by removing one or more stitches ; if the discharge becomes at all profuse, if the edges do not remain in contact, or if they show a blush or much

tension, he substitutes a bread and water poultice for the previous dressing, and continues it until the deeper portion of the wound has closed, washing the wound at each dressing with tepid water containing permanganate of potash, or some other powerful and unirritating antiseptic.

To this address and these statistics Mr. Lister replied with a detailed account of 32 cases of operations upon, or injuries to joints, prepared by Mr. Watson Cheyne, and published in the *British Medical Journal*, November 29, 1879, and with a *résumé* of the results obtained by him at the Royal Infirmary of Edinburgh between November, 1871, and August, 1877, the latter being presented at a meeting of a branch of the British Medical Association, held at St. Thomas's Hospital, December 3, 1879. His list, tabulated to correspond with Mr. Savory's, is as follows :

	Total	Deaths		Deaths by Blood-poisoning	
	Cases	No.	Per cent.	No.	Per cent.
INJURY	72	4	5.7	0	0
MAJOR OPERATIONS .	725	37	5.1	6.	0.82

Of the operations, 292 were for various reasons not treated antiseptically, and these gave 4 deaths by blood-poisoning ; the remaining 553 cases treated antiseptically give only 2 deaths by blood-poisoning, one of them due to pyæmia after amputation of the breast, the other due to erysipelas.

The excellence of these results, both absolute and relative, cannot be questioned ; but their value would be enhanced by a knowledge of the details of each fatal case, for, as Mr. Savory eloquently said, in the keen and noble rivalry which has sprung up between surgeons and institutions to reduce mortality due to blood-poisoning to the lowest possible terms, the judgment will be swayed by the desire, and in the anxiety to escape what has happily become almost the disgrace of the occurrence of blood-poisoning in any case under one's care, the signs of it are rather open to be misinterpreted, or explained away, or called by some

other name. Thus it would be interesting and valuable to know the causes of death in the three cases of spina bifida and one of hydrocephalus, treated by Mr. Lister by the introduction, under antiseptic precautions, of two or three horsehairs, all of which terminated fatally, but in none of which is the death charged to blood-poisoning. Certainly, if the deaths were in any way attributable to the operation the fact should be made known, both in the interests of science and to check the manifest and growing tendency to believe that antiseptic precautions justify recourse to operative interference in cases and under conditions where heretofore it has been considered entirely unwarrantable. If those four deaths were due to the interference, Mr. Lister's mortality from preventable causes rises from 6 to 10, and the percentage equals Mr. Savory's. In like manner it may well be doubted whether Mr. Lister's confidence in his method did not lead him to make three amputations at the hip-joint and one at the shoulder, which another surgeon would not have made, and all of which terminated in speedy, almost immediate, death. One of them was for "an enormous fibroma," a benign tumor ; two were for injury, and the patients were in collapse at the time of the operation ; of the remaining one he says : "I operated for myeloid disease of the thigh-bone. The bone looked sound when I divided it ; but on microscopic examination there appeared to be disease, and I amputated the next day at the hip-joint. The patient died in twenty-four hours." It is true, as he claims, that these deaths are not to be taken into account in estimating the power of a dressing to prevent blood-poisoning ; but if the operations were inspired by confidence in the dressing, one death certainly, and probably two, are as fairly chargeable to it as if they had been caused by pyæmia developed under it As to the other two, it may be said that death would have occurred in any case ; but that is not a reason for operating, and such interference needlessly compromises our art.

We turn to Mr. Lister's cases of injuries to and operations upon joints with a feeling of almost unmixed satisfaction and pride in his success. The qualification is due to the presence in

this list also of one, possibly of three, operations out of a total of twenty, where the interference, although entirely successful, will be looked upon by many as of doubtful propriety. In one case a ganglion was removed from each wrist, the sheaths of the tendons and one wrist joint being freely opened. In another, partial excision of the elbow joint was done on account of a badly united fracture of the humerus which prevented extension of the forearm beyond an angle of 120°; and in a third a transverse fracture of the patella was treated by opening the joint and wiring the fragments together. Leaving aside this question of the propriety of interference which arises in only a few of the cases, the general results are excellent. In thirty-one of the thirty-two cases of operation or injury the treatment was entirely successful, except that in two cases the joint remained stiff, and in one, an ununited fracture of the neck of the femur, union did not take place, although pain was relieved. The solitary failure followed an attempt to save a badly crushed wrist and hand ; putrefaction occurred, and a partial amputation was done. Among the twelve cases of injury were two compound fractures communicating with the elbow joint, two compound dislocations of the ankle, one compound fracture of the femur communicating with the knee joint, one punctured wound of the ankle, and two wounds of the knee joint, one of them being a large lacerated wound with mud ground into the articular cartilage of the femur. In only one of these cases is it mentioned that the temperature rose to 100° F.

Such a series of good results has, we believe, never before been obtained. Mr. Bryant, commenting upon it, says, " Equally good cases might be got out of the ordinary book of the hospital surgeon ;" but that assertion is too indefinite to carry much weight. Undoubtedly as good results have been obtained in single cases, but until another such integral record is published this one must be considered unequalled.

Space does not permit a prolonged examination of the many interesting points connected with this subject, but it may be profitable to consider some of them for a moment. In the first place, all agree, opponents as well as partisans, in recognizing the

gain to surgery from the improved methods in the treatment and care of wounds that have been the direct outcome of the introduction and discussion of this method. Whether the theory and practice will win universal acceptance, or share the fate of so many surgical novelties, Mr. Lister will still rank among the great benefactors of his kind. The importance of keeping wounds clean and at rest, of thorough drainage, and of cat-gut ligatures, has been impressed upon us in such a way that it is not likely to be again forgotten or neglected. We have learned that it is possible in great hospitals to habitually obtain speedy union after major amputations without increasing the risk of pyæmia by the attempt, and to save both life and limb after compound fracture with penetration of a joint. Operations which were formerly thought to involve too much risk to life are now frequently and safely performed; while, on the other hand, this increased security has perhaps led to the too ready substitution of the knife for equally good non-operative or less severe measures.

The Lister method, employed in its purity and with all its details, has proved itself able to practically abolish pyæmia, hospital gangrene and erysipelas from large, ill-conditioned, infected hospitals, where, previous to its introduction, these diseases attacked almost every wounded patient. Volkmann's experience alone is a sufficient proof of this, but it is corroborated by Nussbaum's in a manner which also shows that the previous existence of these diseases was not due to the carelessness of the surgeon. Nussbaum had two hospitals, a large public one in Munich and a smaller, though still large, private one just outside the city. The latter was kept almost free from hospital disease, while the most earnest efforts, including the use of various antiseptics and the open treatment, failed to purify the former. At last the Lister method was introduced, and its introduction was followed by the almost total disappearance of septic complications

Now, while these facts impose upon a surgeon the moral obligation to employ the Lister method under similar circumstances, or in the place of any personal method which fails to yield an equally high percentage of successes, they do not necessarily

prove the correctness of Mr. Lister's views concerning the origin of wound complications, or the agency to which the efficiency of his dressing is due. His theory, and in the heat of the discussion over the details it appears to have been accepted almost without question in England and Germany, is that putrefaction of the wound secretions is the one active and efficient cause of the complications which he seeks to avoid, and that its action depends directly upon the absorption of its products, upon their introduction into the circulation through the blood-vessels of the raw or granulating surface. This putrefaction being set up solely by the agency of germs brought to the wound from without, the details of the dressing are designed to prevent their deposit upon it or to destroy them. It is claimed that the spray destroys all germs floating in the air, and therefore it is employed during the exposure of the wound at the time of the operation and at the subsequent dressings, while the carbolic acid contained in the gauze is relied upon for protection during the intermediate periods.

Of the four principal assertions upon which the method rests, two lack a demonstration. These are : the agency of putrefaction in the origin of blood-poisoning, and the power of the spray to purify the air. We have elsewhere* given reasons based upon experimentation for doubting the possession of this power by the spray, and Mr. Lister's own records show clinically that as good results can be obtained without its use as with it. He reports thirty-three cases of compound fracture and seven of wounded joints ; these wounds were of course received without the protection of the spray, and their primary disinfection was sought by washing them out with a solution of carbolic acid in water or in alcohol, and yet they furnished not a single death by blood poisoning. Their record in this respect is even better than that of the operations where the spray was used, and it certainly seems, therefore, as if the use of the spray might be dispensed with. Mr. Cheyne, indeed, speaks of it as the least important of all the precautions, but apparently Mr. Lister does not hold the same

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* *Am. Journal of Medical Sciences*, January, 1880.

opinion, for he attributes the occurrence of pyæmia in his fatal case of amputation of the breast to the misdirection of the spray, apparently during one of the dressings.

That putrefaction of the wound secretions is the sole or most common cause of blood-poisoning is not only not proven, but the weight of evidence is against it. We cannot here do more than mention the grounds upon which this statement is based. They are of two kinds : 1st, those which indicate another cause ; 2d, those which show the comparative harmlessness of the products of putrefaction.

The contagiousness of erysipelas, its frequent independence of an open wound, and its occurrence about slight wounds or those that have nearly healed, give it a character entirely distinct from pyæmia or septicæmia, and indicate a cause independent of putrefaction.

In like manner, the contagiousness of pyæmia, its comparative limitation to crowded surgical wards, its greater frequency in the winter, and its relatively tardy appearance, are not compatible with the theory of a causative putrefaction ; while its rarity after simple wounds, its frequency after those that are associated with much laceration and bruising of the tissues, and its more common occurrence (other things being equal) in those reduced by habit- ual exposure or dissipation, point towards an auto-production of the poison dependent upon altered vitality of the tissues involved in the injury.

Another variety of blood-poisoning, characterized by a rapid onset and extreme severity, is seen especially in military surgery, under physical conditions which are not only unfavorable to the origin and spread of a putrefactive process, but are also generally considered almost a guarantee against septic complications. Sol- diers exhausted by forced marches and dispirited by defeat, ope- rated upon in the open air, lying in tents or farm-buildings, often at seasons when everything is frozen, furnish an enormous per- centage of mortality from this cause, and die even before their wounds have begun to suppurate. During the siege of Paris the mortality after operations was unparalleled ; Nélaton lost 68 out of

70 amputations at the Grand Hotel; Guérin saw almost every amputation at St. Louis end fatally until during the subsequent Commune, when he began to envelope his stumps in thick layers of cotton and leave them undisturbed for weeks. Under that treatment his patients recovered, although they were men and women exhausted by the privations of a five months' siege during an exceptionally inclement season, frenzied by drink and passion, and suffering from gunshot injuries, and although putrefaction went on so actively under the dressings that the odor in the wards was very offensive. It must be remembered, too, that at that time he made no attempt to get primary union; he filled the wound with cotton and left it to granulate from the bottom. Its whole surface was bathed for weeks in fetid pus, and yet poisoning did not occur.

It is well known that the danger of *post-mortem* inoculation, itself a septicæmic affection, varies with the cause of death, being greatest after puerperal or surgical poisoning; and in these and other cases it diminishes with the appearance and progress of putrefaction. Men with open cuts upon their hands can handle putrid matter with comparative impunity, while Sir James Paget was poisoned almost fatally by absorption through the unbroken skin of his hands of the virus of a puerperal peritonitis.

Experimentation has shown that to render a rabbit septicæmic injections of 10, 20, even 30 drops of putrid blood are required, and even these are not uniformly successful; but the desired effect can be produced speedily and certainly by the injection of the millionth part of a drop of fresh blood taken from another animal dying, or just dead, of septicœmia. Moreover, if this latter blood is allowed to putrefy, it loses its virulence.

Vulpian produced by the injection of a small amount of the extract of bitter-sweet under the skin of a frog a septicæmia identical with that produced by the similar injection of a true septicæmic virus; and he got a like result from the action of a corrosive substance, cyclamine, upon the œsophagus.

By exciting an acute attack of indigestion, a German pathologist asserts that he has recently caused pyæmia and putrefaction

of the discharges of the wound in dogs recovering under antiseptic treatment from injuries to their bones ; and although too much importance is not to be attached to these isolated and unverified experiments, they nevertheless deserve mention.

Pasteur, whose statements are always to be received with respect, has described a septic vibrio that is entirely distinct from the vibrio of putrefaction, and a vibrio of purulent infection (pyæmia) which somewhat resembles the latter. These vibrios are found in abundance in ordinary water and in the air in the form of corpuscle-germs ; and he claims that the only reason why they do not seriously complicate every wound is that the vital action of the tissues is unfavorable to their development and multiplication. The virulence of the septic vibrio depends greatly upon the liquid in which it has been developed, and after having been greatly diminished by successive cultivations in one kind of liquid it may be so promptly restored by a single cultivation in another that $\frac{1}{2000}$th part of a drop will kill, and the blood or serum of the animal thus killed has a virulence infinitely greater still.

Finally, it is a fact daily observed that purulent collections of extreme fetidity may exist in the body without giving rise to blood-poisoning ; the commonest example, perhaps, is found in abscesses of the ischio-rectal fossa.

It is evident, then, that there is something to be guarded against in the treatment of wounds besides putrefaction, and this something is in the nature of a specific poison which, there is reason to believe, may be generated in the body *de novo*, and which certainly is transmissible. This view harmonizes apparent clinical contradictions, and explains the success of different methods of treatment as the theory of putrefaction cannot do. There is nothing in it incompatible with the belief that putrefaction may be positively injurious, either by furnishing a suitable nidus for the development of specific germs, or by so modifying adjoining tissues whose vitality is already compromised as to turn the scale in favor of the occurrence of an actively poisonous process therein. According to it the Lister dressing acts by destroying specific germs that fall upon the wound during the operation, by

preventing the arrival of others subsequently, and by drainage, rest, equable pressure, and the absence of ligatures ; and when these conditions are realized by other means, equally good results may be expected. LEWIS A. STIMSON.

NEW BOOKS AND INSTRUMENTS.

Studies in Pathological Anatomy. By Francis Delafield, M.D., Adjunct Professor of Pathology and Practical Medicine, College of Physicians and Surgeons, New York. Nos. 11 and 12, December, 1878, and January, 1879, and Nos. 13, 14 and 15, November and December, 1879. 8 vo. New York. William Wood & Co.

The above numbers of the Studies in Pathological Anatomy of which Dr. Delafield began the publication in series, in February, 1878, are comprised in two fasciculi which were given to the public sometime after the date of their promised appearance.

Nos. 11 and 12 are devoted to a clear and concise letter-press description of some of the clinical features and the pathological history of : The pneumonia which occurs after surgical operations and injuries ; the lobular pneumonia of children and adults ; interstitial pneumonia ; and the pneumonia produced by pressure on the trachea and bronchi. Under lobular pneumonia mention is made of the minute appearances of the hepatized lobules which occur in whooping cough, measles, and scarlatina, as well as of the distinction between hepatized nodules of pneumonia and the areas of atelectasis. The five accompanying plates are beautifully executed, and very faithful reproductions of what a good lens will show in well prepared sections from lungs in these morbid states. The only criticism we have to make not entirely commendatory of these drawings is, that while the contents of the pulmonary alveoli are carefully traced, but little attention has been paid to the condition of the connective tissue and blood-vessels of the alveolar walls.

The fasciculus comprising Nos. 13, 14 and 15, has the interesting caption "acute miliary tuberculosis." The importance of this

subject and the position which the author holds in this country as a teacher, seem to warrant a somewhat extended abstract of his opinions, which are in some respect at variance with those now becoming very generally entertained.

After a very short reference to the views of Virchow, Wagner, Schüppel, Charcot and a few others, the author occupies some ten pages in reviewing the results of his own investigations into the anatomy of miliary tubercles and their clinical relations and significance.

Dr. Delafield recognizes two forms of tuberculosis, acute and chronic.

He does not always see the same structure in the individual tubercles, but distinguishes four principal varieties of miliary tubercle in the lungs, as follows :

1. Miliary tubercles entirely composed of amorphous granular matter and a few shrunken cells, and an external zone of pus cells. These tubercles cannot be said to possess a definite anatomical structure. Some appear cheesy, degenerated, and the alveolar walls seem to be destroyed within them. In others, however, the walls of the air cells are intact, while their cavities are filled with amorphus granular matter. The earliness and completeness of the degeneration of these tubercles and the absence of any visible stages of degeneration entitle them to separate consideration. Miliary tubercles of this same undeterminate character are also not uncommon in the peritoneum.

2. Miliary tubercles principally composed of new tissue, which apparently replaces the parenchyma of the lung, while on the periphery of the nodule of new tissue are air vesicles filled with cells. The solid new tissue is composed of elements, having the same general appearance but arranged in two different ways. Part of the tissue is arranged so as to form irregularly spherical bodies ; the rest is found as a diffuse infiltration around and between two or more of the above-mentioned spherical bodies. These spherical bodies we call for convenience " tubercle granula," the diffuse tissue, " diffuse tubercle."

The centre of each " tubercle granulum " is often occupied by a large mass of protoplasm filled with nuclei. If one of these masses of protoplasm or *giant-cells* is isolated, its branching processes are seen to be apparently continuous with the basement substance between the surrounding cells. The rest of each " tubercle granulum " is composed of cells of regular polygonal shape, imbedded in a basement substance. There may also be

found pus-like cells. This basement substance varies in its character in different tubercles ; it may resemble reticulated connective tissue, or it may be a delicate finely granular material requiring careful demonstration ; and between these two extremes there are to be found many gradations. The giant-cells are often entirely absent from the " tubercle granula," or there may be two or more in one. " Diffuse tubercle " has the same structure as the " tubercle granula," but the giant-cells are less constantly present, the basement substance is better marked, and the small round cells are more numerous.

3. Miliary tubercles composed partly of solid tissue, partly of air-vesicles filled with epithelium, pus and fibrin. The walls of the latter are not thickened, their blood-vessels can be injected.

These tubercles differ from the second variety, in being composed not merely of solid tissue replacing the air-vesicles, but a larger part of the tubercle is composed of filled air-vesicles. It is very difficult either in the second or third variety to see anything which looks like an early stage of infiltration of the wall of an air-vesicle.

The second and third varieties do not usually occur in the same lung ; but in different cases of acute tuberculosis the lungs are filled with the one or the other variety, hence it is hardly proper to look on them as different stages of the same process.

4. Miliary tubercles which consist simply of infiltration of the walls of air-vesicles, of bronchi, and of lymphatics. Many of them are composed of " diffuse tubercle," not of " tubercle granula "; they rarely contain giant-cells. Some of them seem to consist of nothing but small round cells inbedded in a basement substance. This variety of tubercle does not occur alone, but is found in larger or smaller numbers, in some lungs which contain the second and third varieties.

It has become the fashion to lay great stress on the absence of blood-vessels in miliary tubercles, and to ascribe the cheesy degeneration to scantiness of the vascular supply. There is some exageration in this. After artificially injecting lungs affected with miliary tuberculosis, the injection is not indeed seen to penetrate the granula, but it is found to run freely in the walls of the air-vessels which form part of the miliary tubercle. It is only the first variety of cheesy tubercle which cannot be thus injected. If we look at the miliary tubercles which occur in other parts of the body, we find a repetition of what we have seen in the lungs.

Thus we find that the bodies commonly known by the name of

miliary tubercles do not all have the same structure. In the larger number of miliary tubercles, there is a peculiar kind of tissue which exists nowhere else, a tissue composed of polygonal and giant-cells, imbedded in a basement substance. This tissue, as being the only anatomical characteristic of tubercle, we may call tubercle tissue. And according to the arrangement of its element we may divide it, as already mentioned, into " tubercle granule," and " diffuse tubercle." We have seen that some tubercles are formed exclusively of turbercle tissue, some of tubercle tissue and ordinary products of inflammation, some of cells resembling those of tubercle tissue, but not regularly arranged in a basement substance, while some contain no tubercle tissue at all. The temptation is great to deny the name of miliary tubercle to all the nodules which do not contain tubercle tissue, and it is to be hoped that further study may enable us to do this.

Concerning the circumstances under which miliary tubercles are formed, the author distinguishes, first, general tuberculosis, and second, local tuberculosis ; and he recognizes the following clinical divisions.

(1.) Idiopathic acute general miliary tuberculosis ; of this form, he says the opinion has prevailed that the cause of the disease in these cases is a focus of pus, in the condition of cheesy degeneration in some part of the body. So many cases, however, occur in which no such focus exists, that such an opinion is no longer tenable.

(2.) Acute general miliary tuberculosis, in persons alread suffering with chronic pulmonary phthisis.

(3.) Acute local miliary tuberculosis, in persons already suffering from chronic phthisis. In the-e cases the miliary tubercles are usually confined to the lungs, the pleura, and the pia mater, but may also occur in other parts of the body.

(4.) Acute local miliary tuberculosis in persons not suffering from chronic phthisis.

From the consideration of the anatomy of miliary tubercles and of the circumstances under which they occur, we are driven to one of two conclusions.

1. The tubercles have no essential anatomical character, but vary in different cases, and certain persons, either from the absorption of cheesy matter, from natural constitution, or from unknown causes, become tuberculous. In this case, the clinical history must decide the diagnosis and determine the nature of the miliary nodules ; or,

2. There is a definite and essential anatomy belonging to tubercles which can be always recognized. Then it must be admitted that tubercle is composed of a tissue on the border line between the new-growth and the inflammatory products. This tissue develops under a variety of circumstances, and is not confined to persons suffering from general tuberculosis, but occurs as a strictly local lesion. We must admit that in acute general tuberculosis all nodules found, post-mortem, are not composed of such tissue. In other words, tubercle is not a specific tissue of indifferent character, produced by a variety of circumstances. It may be the lesion of a general disease, or the lesion of a local, progressive inflammation, or an accidental lesion forming a non-essential part of local inflammation and new growths.

From the foregoing, it is obvious that our author is strongly inclined to question the belief, now very prevalent, that local tuberculosis usually is excited by the irritation of a specific virus generated in a cheesy focus somewhere in the organism, and conveyed generally by means of the lymphatics of the part where local miliary eruption appears, and that general tuberculosis is due to the passage of the virus beyond the lymph glands and vessels into the general blood circulation. He also seems to believe in the existence of at least four separate and distinct forms of miliary tubercle, and to deny that these four different varieties are due to inflammatory and other secondary modifications of one form of lesion. Whether these views are right or wrong must be decided by further investigation and by comparison with the results of other observations. Perhaps the author himself will soon find opportunity to raise an iconoclastic hand against them, or contrast with them some other piece of the " patchwork " of pathology to which he has been ambitious of adding. In these fasculi he has repeated the blunder of obscuring his own views, if indeed he entertains any positive and fixed opinions of the subject of tubercle, by indulging as usual in self-contradictions and inconsistent statements. We had occasion, in a former review in this journal, to call attention to some glaring faults of the same character which marred many of the pages of the earlier numbers of this work. We are sorry to note evidences of continued carelessness of this kind in the pages at present before us.

As an offset to the positiveness with which Dr. Delafield now attempts to establish four different varieties of tubercle, we will content ourselves with a simple quotation from an article from an earlier number, " Tubercular Peritonitis." " It is evident that we

can make no real advance in our knowledge of tubercle unless we adhere strictly to some one anatomical lesion as being tubercle. All the accompanying inflammatory products must be recognized as accessories only." " Tubercle is never produced alone ; there is always at the same time fibrin, or pus, or serum, or a new growth of connective tissue cells."

We have none other than the most favorable comments to make upon the plates illustrative of the pathological histology of pulmonary tuberculosis. They are excellent and accurate in detail, and whatever may be the fate of the author's views, his drawings will remain and be regarded as valuable and lasting contributions to the microscopy of the subjects with which he deals.

On the whole, we think that these last numbers, just passed in review, are more praiseworthy than the first.   [E. O. S.]

A Clinical Treatise on the Diseases of the Nervous System. By M. ROSENTHAL, Prof. of Diseases of the Nervous System at Vienna ; with a preface by Prof. CHARCOT. Translated from the author's revised and enlarged edition by L. PUTZEL, M.D. New York, William Wood & Co., 1879, pp. xvii–555.

The author has been known for nearly or quite twenty years past as connected with the Vienna General Hospital, first as assistant physician, then as docent, now as professor. He has been the author also of a treatise upon the use of electricity in medicine. Unfortunately his style, both in lecturing and in writing, is not easy ; he is too frequently obscure, there is too much theorizing and a want of vividness in description. It would be almost impossible to render the German into simple, smoothly flowing English, and the translator has acquitted himself with credit in giving so good a translation. Certain wood-cuts have been inserted in the text by the translator, who hopes their utility will atone for the liberty. These are not always placed where they would be most useful. Thus the distribution of the middle cerebral artery (p. 43) would better serve to illustrate embolism of the artery than cerebral hemorrhage. Fig. 4 (p. 75) is no help to understanding what an embolus is, and belongs rather under the division of pathological anatomy than etiology. Fig. 9 (p. 108) does not aid in understanding what a tumor of the anterior lobe may be, and with no reference to the particular case, with its symptoms adds nothing essential to our knowledge. A drawing of the motor centres, according to Ferrier, with a few words of explanation, would have been of value, and would have been in

just the right place here. Figs. 10 and 11 may be of some value. The plates showing the "motor points" as aids in the application of electricity, would be of much greater value if placed by themselves at the end of the book with a few words of explanation. As it is they have only a remote connection with the text, and without explanation would be a puzzle to the student and to many physicians.

It is difficult to do justice to the author in the space at our disposal ; on the one hand, the book has many merits, and much to commend it to the attention of the profession. This is especially true in regard to the classification, the description of many diseases, and, on the whole, in regard to treatment. Electricity is given a reasonable prominence, and the author has not claimed too much for it ; being the author of a book on electro-therapeutics, he has yet avoided giving undue prominence to that agent. Much more is said in regard to hydro-therapeutics than is usual in either American or English works. This is a decided advantage, but the directions are generally not sufficiently minute.

It would be strange if two physicians should agree exactly in regard to the prominence which ought to be given to the various symptoms in a description of diseases, many apparent omissions might therefore be passed by unnoticed ; but there is a general impression left upon the mind of the reader that this book is not as fully up to the times as it ought to be. Comparatively few of the references are to recent publications. Primary sclerosis of the lateral columns seems to be one of the latest productions, and in that is a reference to the year 1876. On closer examination also it is seen that some of the later results of neurological study are imperfectly reported or neglected. Thus the value of an observation of the temperature as a means of diagnosis and prognosis in cerebral hemorrhage and embolism is not recognized. Prof. Rosenthal states that in cerebral hemorrhage there is in the beginning an elevation of temperature, whereas there is first a depression below the normal, then a steady rise, and when the case is about to terminate fatally, the rise is almost continuous till death. If not immediately fatal, the temperature is depressed, then elevated, and then oscillates just above or at about the normal. In embolism the initial depression of temperature is wanting as a rule, and after the initial elevation it returns more regularly to the normal than when there is hemorrhage. In hemorrhage a second depression of temperature is significant of a second outpouring of blood.

Apparently the author is not familiar with English, as it is rarely that any English publications are referred to, and when the results obtained by American or English observers are mentioned, it is in such a way as to lead one to suppose that only abstracts have been seen. This would explain the silence in regard to the labors of Ferrier. The whole subject of localization is only very briefly referred to with a mention of Fritsch and Hitzig ; but the French have taken up this subject and studied it extensively, and the Germans have not neglected it. Charcot, Lussana and Lemoigne, Grasset, Dieulafoy, Pitres, Raymond, Raynaud, Lépine, Championnière, Onimus, Foville, Delahousse, Gouguenheim, Dreyfous,— this is a goodly list of French observers. Gliky, Ewald, Goltz, Vetter, Goldstein, Hertzka, Goltdammer, Bejer, Kahler and Pick, Munk, Soltmann, Nothnagel, Stark, Eulenberg, are among Germans who have written on this subject ; and as Rosenthal has himself contributed to the literature of cerebral localization, it can not be through ignorance that the book has not been brought down to the latest date.

Again in the treatment of vertebral caries, nothing is said in regard to Sayre's plaster jacket, nothing of Taylor's and similar apparatus, "mechanical and orthopedic treatment is of the greatest importance when begun at an early period." Now it is a well-established fact that, in many cases, when begun at a late period, great and permanent benefit may be obtained.

The phenomenon called " tendon " reflex has gained considerable prominence in connection with locomotor ataxia, and though occasionally cases are met where it is not absent, yet its absence is one symptom which ought to be mentioned ; but no mention of this is made, and tendon reflex is referred to only in connection with apoplexy.

In the treatment of sciatica the method of applying the hot iron is not described with sufficient minuteness ; the iron should be at a *white* heat, and passed rapidly over the skin so as merely to shrivel up the cuticle, causing no suppuration. Thus used the application is not painful, it is less unpleasant than blistering, and generally more effectual. Nerve stretching is not even mentioned, though many very remarkable cases have been reported, and the operation has been used in cases of neuralgia of the face and limbs.

These omissions are probably owing to the fact that the second edition of Prof. Rosenthal's work appeared in 1875, and though there is evidence of a slight revision, it has been only partial,

hence the work is five or six years behind the latest advances in nervous disease. As viewed from the time it was written the work is good, especially the chapter on cerebral tumors.

[s. g. w.]

Dictionary of the German Terms Used in Medicine.
By GEORGE R. CUTTER, M.D., Surgeon to the New York Eye and Ear Infirmary, etc. New York, G. P. Putnam's Sons, 1879. pp. 304.

Any one who has had any experience with German medical literature, must have noticed the frequency with which the peculiarly German names are used for the different parts of the body, instead of the Latin or Greek terms, which would be universally understood. Examples of this occur on almost every page of any German medical work. " Harnröhre," " Herzbeutel," " Scheide," " Bauchfell, ' if more picturesquely descriptive, are certainly less intelligible to the man of moderate attainments in German, than would be the only terms which we have in English to express the same things, and which are in universal use, Urethra, Pericardium, Vagina, and Peritoneum. These are but a few examples of what will occur to any one who begins to read German, and just this peculiarity makes such a book as the one before us of value.

Aside from this, the book will undoubtedly meet a want felt. As the author says, in the preface, it gives the student, in a convenient form, what only the largest German dictionaries contain, and even then in so bulky a form as to be practically of little value.

The work seems to be well done, and in most departments of medicine, especially anatomy and physiology, the German terms are exhaustively given. But medical chemistry and therapeutics are somewhat neglected. Words in common use, found in any report of chemical examination of the urine, as " Salpetersäure," Nitric Acid ; " Schwefelsäure," Sulphuric Acid ; and " Harn-äure," Uric Acid, are wanting. And even " Cylinder," the word for Casts, is not found. " Sauerstoff," Oxygen ; " Wasserstoff," Hydrogen ; " Natron," Soda, and " Kali," Potash, are also not noticed, and very few of the common names for the more simple medicines, as, for instance, " Bleizucker," Sugar of lead, are included in the work. Such omissions should not occur in a book on the whole so complete, for they are connected with a not unimportant branch of medicine.

The general plan of the work and its form are very satisfactory.

The type is clear, and the book of a convenient size. The definitions seem correct and sufficient, and on the whole it shows faithful and careful work on the part of the author. It will undoubtedly prove a valuable help to students whose acquaintance with German is limited, and when we remember the rank Germany holds in medical science, its appearance is certainly timely.

[F. H. D.]

A Text-book of Electro-Therapeutics and Electro-Surgery, for the Use of Students and General Practitioners. By JOHN BUTLER, M.D., L.R.C.P.E., etc. Lectures on Electro-ther., New York Homœopathic Med. Coll., etc., etc. New York, Bœricke & Tafel, second ed. 1878, pp. 318.

We regret that, with every intention to be fair, or even generous, if the sentiment were called for, we can find but little to say in praise of this work, which has nevertheless reached its second edition in little more than a year.

This fact, as well as the contents of the book itself, both serve to illustrate anew how wide is really the breach that separates the sincere homœopath from the bulk of his "regular" colleagues not only in practice but in constitution of mind.

We who claim that title should no doubt all admit that the application in therapeutics of the principles and discoveries of electro-physiology and electro-chemistry is so difficult as to call for the utmost care and conservatism ; yet we believe in the importance of scrutinizing and reiterating these principles over and over, as a key without which the meaning of the cypher can never be completely disclosed. Dr. Butler prefers to put them aside with a brush of the hand, and with them the surely natural principle of making therapeutics lean simply upon pathology, gives himself up to the study and treatment of "symptoms"—the old story over again, and a fresh proof, if one were needed, how fallacious is the habit of reasoning by the purely inductive method, when, as in medicine, the data are necessarily imperfect.

Again, most of us would feel well satisfied, for the present, if we could confidently affirm, with Dr. G. V. Poore (*quoted*, p. 18), that electricity is a "stimulant, anodyne, sedative, caustic, styptic or cautery." For Dr. Butler, however, " if that is all electricity is, we certainly can do as well without its use as with it." (*Ibid.*)

A Hottentot cannot argue with a Hindoo for the lack of a common tongue, nor would it be more useful for us to attempt a further analysis of a book with the whole plan of which we find

ourselves so utterly out of sympathy.   It is fortunately true that
the majority of the practical rules for the application of electricity
are familiar and in accord with established views, though we find
nothing even in this part of the work that is worthy of special
comment. The " infinitesimal " has for electro-therapeutics grown
bigger and become " mild " or " weak," which is fortunate from
every point of view.   [J. J. P.]

ABSTRACTS AND SUMMARIES.

Castration of Women (Oophorectomy.) At the recent meeting of the Society of German Naturalists, in the Gynecological Section, Prof. A. HEGAR, of Freiburg, read a paper on what he terms Castration, but what is here generally known to us as Battey's operation. He reports forty-two cases, an unusually large number, but which may be accounted for by his having many patients sent to him from a distance.

He divides his cases into five groups, the first of which includes thirteen cases, all of small tumors.

Here he remarks that the line between ovariotomy and castration is very hard to draw ; the indications and the steps of the operation when the tumor is small, resembling very nearly castration. He has therefore included all cases where both ovaries were removed, and where they did not exceed a billiard ball in size. The tumors were cystomata, dermoids, par-ovarian, and the so-called tubo-ovarian cysts ; both tumors being of the same variety or were in combinations. There were some cases of tubo-ovarian cysts, hydrosalpinx with adhesion of the fimbriæ to the degenerated ovaries. These were all double and complicated with extensive adhesion, and depended on inflammatory process in the pelvis.

Other complications in this group were congestion of the uterus and retroversion.

As a diagnostic mark between a uterine fibroid and a small ovarian tumor adherent to the uterus, he proposes a forcible attempt at separation by the finger in the vagina, in which a sort of fremitus can be appreciated from the yielding adhesions. These cases he considers as extremely difficult, the operation fully equal-

ling an extremely complicated ovariotomy. There were two deaths, one from sepsis and one from incarceration, eight were fully cured, and three still complained of pains in the pelvic regions.

The *second group* included twelve cases of fibromata. The tumors were not very large, not reaching above the umbilicus, excepting one only which reached great size. He considers castration in the case of very large tumors to be of very doubtful propriety. There were three fatal cases—all septic peritonitis. In six cases the menopause ensued and the tumors shrivelled. In one case included in the first group, there was a fibroid which also disappeared.

In the case of the large tumor mentioned, the flow stopped for six months and the patient improved, but owing to bad surroundings and hard work it returned, the tumor grew rapidly and the patient died eleven months after the operation. Autopsy showed an enormous fibro-cyst.

In the *third group* there are five cases of so-called chronic oophoritis, cystic degeneration of the follicles with changes in the stroma, but without any neighboring inflammation. One death from incarceration. In three cases there was immediate improvement of all the symptoms. The other case is new, but is improving.

In the *fourth group* there were five cases where the indication for the operation was uterine disease, such as incurable retroflexion and acute anteflexion. There was one death from ileus. In two cases menopause occurred with improvement of the symptoms, and two cases are quite recent.

The *fifth group* is of particular interest, including as it does cases of chronic recurring pelvic inflammation, such as peri- and para-metritis with adhesions, salpingitis, and imbeding of the ovary in firm and solid exudations. The symptoms are always severe. There were seven cases, and notwithstanding that the operations were often difficult and long, there were no deaths. In three cases there was menopause and cure, in one menopause and great improvement. In another there is a regular typical flow, but great improvement. Two cases are too recent to be judged.

The mortality in the cases is only 16.6 per cent. In forty-seven other cases known to the author there is a mortality of 32 per cent. (Average of total nearly 25 per cent.)

Four of the deaths were from septic poisoning and three from ileus the strangulation resulting from adhesions. The results were

often disturbed in the beginning by symptoms similar to those met with at the menopause. The cases seem to prove the old idea of the dependence of menstruation on ovulation. In twenty-six of the thirty cases, the menopause was complete, in only one case there was a typical flow, due perhaps to the periodical congestion of a tender mass of exudation formed around a ligature. Strict antisepsis was used except in the first case, (fatal), but not according to Lister's method. The spray he considers harmful.

The opening in the abdomen he considers has to be made proportionately larger than in ovariotomy, generally the introduction of two fingers is enough. Great care is needed in putting on the ligature and in closing the abdominal wound, so as to avoid abscesses.

In the discussion SCHRÖDER, (Berlin), reported two cases. One a case of insanity with nymphomania, recovery with insanity cured and a myoma which however continued to grow. He operates by laparotomy and uses spray, and has seen no bad results from it.

FREUND (Strasburg) reported three operations for myomata and one for hystero-epilepsy ; one death. Menopause followed in all the cases, and in one only was there no atrophy of the tumor.

VON LANGENBECK (Berlin) expressed his surprise that absence of the vagina had not been mentioned as an indication for this operation. He reported one such case. Menstruation occurred only once after the operation.

MARTIN reported three new cases, two for neuralgia. In one case incomplete development of the uterus, both ovaries lay on the left. All these cases recovered.

MÜLLER (Bern) had operated three times. In two cases the operation was not completed, as the ovaries were so adherent. The third case, ovarian neuralgia, was cured.

CZERNY (Heidelberg) had had three cases, one dying of septicæmia. In one case of hysteria, with enlarged ovaries, there was no improvement. In the other case (hysteria, with retroflexion) he had done Keberlé's operation at the same time.

He had also twice removed the uterus without the ovaries, with the result of stopping all flow. (*Centralblatt f. Gyn.*, No. 20 and 22, 1879.)

In No. 20 of the same journal A. SCHUCKING (Harzburg) reported another successful case. The indication was hysteria.

In the *British Medical Journal* for May 24, 1879, Prof. A. R.

SIMPSON reports a successful case of castration, or, as he called it, *oophorectomy*. His case was one of dysmenorrhœa, with ineffectual division of the cervix uteri and pelvic inflammation ; " senescence" followed.   After giving the history of his case, he gives a long commentary, with a table of thirty-five cases, when both ovaries were removed.   He gives the credit of having brought forward and popularized the operation entirely to Dr. Battey, as well as of having independently conceived and performed it, though Hegar in point of time preceded him.   He gives as the indications, dysmenorrhœa, menorrhagia (from fibroids), amenorrhœa from absence or atresia of the vagina, and complicated with either threatened insanity, hystero-epilepsy or convulsions.   The mortality in his cases is 37.1 per cent.   He prefers laparotomy to elytrotomy, and uses carbolized silk ligature, and then cuts the pedicle.

Beside the cases given above, the reporter has collected a number of cases, some of which have been published and a few are new.

Dr. HUNTER MCGUIRE of Richmond, reports two cases. They were both ovaritis ; Lister and laparotomy were used. " In both cases both ovaries were removed and the pedicles tied with carbolized cat-gut.   The results of the operation in one is eminently successful, while in the other there is a marked and continuous improvement with a gradual subsidence of all trouble traceable to ovarian sympathy."

Dr. GOODELL sends two unpublished cases.   The operation in each case was begun per vaginam but finished by laparotomy. The result in the first case was fatal ; the indication was " a womb bulbous and knotty with multiple fibroids."   The second case recovered, the indication being " pernicious menstruation and threatened insanity."

Dr. WEST of Baltimore, sends one case, a full account of which will appear in the next number of this journal.

Dr. SIMS has had three new cases, all quite recent, and all successful.   The indications for the operation in each case was the occurrence of epileptoid attacks.   Mode of operating not mentioned.

Dr. NOEGGERATH has had ten cases, all done by laparotomy. One death from sepsis and one from hemorrhage.

Dr. BATTEY has had three new cases, but I am unable to give the results.

Dr. TRENHOLME writes " that the case in which I removed the

one ovary is much improved but not well, and as for the other there is nothing new to report."

The total of cases thus collected is 150, of these 104 recovered and 26 died—or a mortality of 20 per cent. I count Esmarch's case, although it was one of hernia, and also all of Müller's, for although in two of them the operation was not finished, still the danger to the patient was fully as great.

	Total.	Laparotomy		Elytrotomy.		REFERENCE.
		Recoveries.	Deaths.	Recoveries.	Deaths.	
Hegar,	42	35	7			*Centralbl. f. Gyn.* No. 20, '79.
Schroeder,	2	2				" " "
Freund,	4	3	1			" " "
v. Langenbeck,	1	1				" " "
Martin,	3	3				" " "
Müller,	3	3				" " "
Czerny,	3	2	1			" " "
Schucking,	1	1				" " "
Battey,	12	2		8	2	*Trans. Am. Gyn. Soc.*, vol. 1.
Trenholme,	2	1		1		*Obstet. J'l., G. B. and I.* 1876
Goodell,	5		1	3	1	" Lessons in Gynecology."
Sims,	7	2	1	4		*Brit. Med. J'l.*, Dec. 8, 1877.
Engleman,	3		3			*Am. Journ. Obstet.*, vol xi.
Thomas,	2	1	1			*Trans. Am. Gyn. Soc.*, vol. i.
Peaslee,	1		1			" " "
Sabine,	1	1				*N. Y. Med. J'l.*, Jan., 1875.
Von Nussbaum,	1	1				Dr. Goodell, *loc. cit.*
Tauffer,	1	1				*Centralblatt f. Gyn.*, 13, 1879.
Netzel,	1		1			" " 14, "
Pernice,	2	2				*Arch. f. Gyn.*, Bd. xiv, H. 3.
Alberts,	1		1			*Centralblatt f. Gyn.*, 18, 1879.
Spencer Wells,	1	1				*Am. J'l. Obstet.*, Oct., 1879.
Simpson,	1	1				*Brit. Med. J'l.*, May 24, 1879
Kaltenbach,	1		1			Hegar, *Saml. Klin. Vorträge.*
J. Gilmore,	1	1				*Am. Journ. Obstet.*, July, '78.
Martin,	2	2				*Berl. Med. Wochen.*, 16, 1878.
Pallen,	1		1			*Am. J'l Obstet.*, July, 1878.
E. Koeberlé,	1	1				*Nouv. Dict. de Med.*, et C, '78.
W. C. Frew,	1	1				*Am. J'l. Med. Sci.*, July, '78.
Prince,	1				1	*Obstet. Gazette.*
Welponer,	1	1				*Centralblatt f. Gyn.*, 25, 1879.
Esmarch,	1	1				*Ob. J'l. G. B. and I.*, Feb. '79.
Tait,	2	2				*Brit. Med. J'l*, Nov. 8, 1879.
Goodell,	2	1	1			Personal Communication.
West,	1			1		" "
Sims,	3	3				" "
Noeggerath,	10	8	2			" "
Hunter McGuire,	2	2				" "
	130	87	22	17	4	

Of the cases operated on by laparotomy, leaving out Dr. Sims as uncertain, there was a mortality of 20.7 per cent.

The cases by elytrotomy show a mortality of only 19 per cent. Still this apparent advantage is more than counterbalanced by Dr. Goodell's experience. where in two cases he was unable to reach the ovaries after opening the vagina, but had to increase the danger by making a second incision.

P.S.—Later reports from Drs. SIMS, GOODELL and WEST, show that all their cases, classed above as doubtful, have recovered. This will bring down the death rate somewhat. Dr. WEST's case will be published in full in the next number.   [M. D. M.]

Amputation at the hip-joint for osteo-sarcoma ; torsion of the vessels. Recurrence of the growth in the stump.

Mr. LUCAS narrates a successful case of amputation at the hip-joint which presents some points of interest, especially in connection with the operative method.

The patient was a man 24 years of age, who entered the hospital for treatment for an osteo-sarcoma involving almost the entire length of the shaft of the femur.   Mr. Lucas, considering the immediate danger of the operation to depend largely upon exposure to cold and loss of blood during it, modified the operation so as to allow the main vessels to be secured before they were divided, enveloped the other limb in cotton wool, and, although a believer in Mr. Lister's method, dispensed with the spray.   The abdominal aorta was compressed by means of Lister's tourniquet, and an assistant stood ready to make pressure if necessary upon the artery at the brim of the pelvis.

An antero-internal flap was marked out by an incision beginning near the tuberosity of the ischium and ending just below the anterior superior spine of the ilium.   The skin and fascia were rapidly dissected up until the superficial femoral artery was exposed ; two pairs of torsion forceps were applied to the artery, it was divided between them, and each end twisted.   The femoral vein and the profunda artery were divided and secured in the same manner.   The capsule of the joint was then opened in front, a postero-external flap cut from without inwards, the limb removed, and the vessels of the posterior flap which yielded but little blood, secured.   The wound was washed with the strong carbolic solution, and covered with gauze, the perineal border of the dressing being fastened down by a broad band of adhesive plaster.

The shock of the operation was considerable, and brandy was administered at short intervals during the following night. The patient was able to leave his bed in a fortnight, and soon afterwards returned to work. Four months after the operation the stump began to enlarge, and he was readmitted to the hospital; the disease was found to have recurred and to extend into the pelvis, and there were also indications that the lungs were similarly affected. No further operation was deemed possible, and the patient remained in the hospital until his death, which was hastened by repeated hemorrhages from the tumor which had broken through the skin and ulcerated.

Mr. Lucas prefers this method to the other in which the vessels are first sought and secured through a longitudinal incision, which is afterwards extended around each side to make the flaps, because he thinks it gives greater security against secondary hemorrhage, the vessels being entirely covered in by the flap and therefore less likely to be affected by adjoining suppuration. His confidence in torsion is very great, he thinks it closes the vessel more securely than a cat-gut ligature, and is even less likely to cause suppuration.—*Guy's Hospital Reports*, 1879.   [L. A. S.]

Local Temperatures in Diseases of the Abdomen. Professor PETER found, with an ordinary clinical thermometer, that the local abdominal temperature in health was about 35.5° C. (37° C. in the axilla.) In various diseases of the abdominal contents he obtained the following results :

APYRETIC AFFECTIONS.	PYRETIC AFFECTIONS.
a. Common ascites, 35.5° C. or even less.	*a.* Simple chronic peritonitis, caused by extension from chronic gastritis; local temperature increased by .8° C. While axillary temp. was lowered (by inanition) .5° C.
	b. Chronic tubercular peritonitis. Increase in abdominal heat of 1° and 1.9° C. At the same time, in last days of life, the axillary temp. was reduced to 34.5° C.
	c. Cancerous peritonitis ; the local elevation amounted to .8° and 2° C.
	d. A differential diagnosis was made between tubercular peritonitis and supposed hysterical tympanitis, by finding a local rise of 1° and 1.5° C.

Académie de Médecine de Paris, Séance du 9 Dec., 1879. *Gazette Médicale*, No. 50, p. 645, 1879.   [E. C. S.]

On the danger of the application of Calomel to the eyes of patients who are taking Iodide of Potassium.

Dr. SCHLAEFKE, gives the results of an extended series of experiments on the lower animals, as follows :

1.   Calomel causes severe superficial inflammation in the eyes of those taking pot. iod.

2.   Iod. pot. taken inwardly is widely diffused through the system and appears in the various secretions and excretions, and may be detected in the tears a few minutes after ingestion.

3.   Iod. pot. taken twice daily in doses of 0.5 gr. may be detected in the tears.

4.   Calomel is very slightly soluble in water, but in three-quarter per cent. sol. of common salt is ten times more soluble.

5.   Calomel powder placed in the conjunctival *cul-de-sac* will be dissolved as such by the constant stream of tears, and hence works *chemically*.

6.   If calomel is used while the patient is taking pot. iod., there are formed the iodide and iodate of mercury, and both of these act as caustics and excite severe inflammation.—*Graefe's Arch.*, Bd. xxv, Abth. ii).   [S. B. ST. J.]

ORIGINAL OBSERVATIONS.

CASE OF PROCIDENTIA UTERI, WITH IMMENSE ŒDEMA ; ESMARCH BANDAGE ; OPERATION. CURE.

By MATTHEW D. MANN, M.D.
HARTFORD, CONN.

In April, 1877, Mrs. K., æt 35, presented herself at my clinic at the N. Y. Dispensary, complaining of falling of the womb. The procidentia had existed for three years, coming on soon after the birth of her third and last child.

The uterus was returned to its proper place, a pessary introduced, and the patient requested to return the next day.

She did not return however until more than a month had elapsed, when she stated that the pessary had remained in place only a day or two, and that the uterus had been down ever since, but now resisted all her attempts to replace it.

An examination showed the uterus procident and enormously swollen. It measured 33 cm. in circumference around the cervix, and from the end of the cervix to the meatus was 15 cm.

The end of the vaginal portion was at right angles to the axis of the fundus, and looked as if a slice had been taken off by a blow from an ax. The cervix was also completely lacerated bilaterally, and was the seat of an extensive inflammatory ulcer, the whole end of the cervix around the os being involved.

An attempt was made to reduce the prolapse, but it failed. She was therefore sent to the hospital, and ordered rest in bed. Three days afterwards the uterus was found to be a little smaller, but all efforts to reduce it were unavailing. On the succeeding day, having provided myself with an elastic bandage, made of thin, pure rubber about 5 cm. in width, and having again failed to reduce the prolapsed mass, I wound the bandage carefully around the whole, beginning at the cervix, and using as much

pressure as the patient could bear. As soon as the bandage be-
came a little loose, it was reapplied. Noticing that there was a
slight serous effusion from the surface of the ulcer, I took an ex-
ploring needle and made numerous small punctures over the
whole ulcerated surface. A large quantity of serum exuded from
these points, and in half an hour the uterus was so much dimin-
ished in size that its reduction was possible.

After a ten days rest and vigorous use of hot water injections,
the parts were so far returned to a natural condition that I ven-
tured to repair the laceration of the cervix. This was quickly and
easily done, as the whole organ could be readily withdrawn from
the body. Fifteen sutures were required to bring the flaps to-
gether. Perfect union followed, and on taking out the sutures I
found the circumference of the uterus at the cervix reduced to
10 cm. After an interval of two weeks I performed Simons'
operator of colporrhaphia posterior, thus narrowing the posterior
wall of the vagina, and making a strong perineum. This operation
was also successful, and the patient left the hospital apparently
cured. Two years after this she returned to report that six
months before she had given birth to twins, and was still in per-
fect health.

The points of interest in the case are the great size of
the uterus, the application of the Esmarch's bandage, combined
with multiple punctures to reduce the swelling, and the fact that
a uterus which had been so greatly displaced and diseased could
so far return to a natural condition as to allow of the occurrence
of pregnancy, and of its going on to a successful termination.

A CASE OF TRIGEMINAL NEURALGIA CAUSED BY SYPHILIS.

By EDWIN WALKER, M.D.

EVANSVILLE, IND.

A. J., æt. 51 years, American, steamboat mate, applied to me
for treatment October 10, 1877.

History.—He stated that he had suffered from severe neuralgia
of the right side of the face since 1870 ; in that time he had never
passed a whole day without some pain. He was always worse in
wet and changeable weather, and at these times the pain would be-
come so severe that he was confined to the house and was unable
to sleep for forty-eight hours or longer, unless under the influence
of an opiate. These attacks would last, with more or less severity.

as long as the weather continued unfavorable, in some cases two or three weeks.

The pains were not worse at night.

Otherwise his health was good, but he did not feel as well as formerly. He lived a hard, exposed life ; said he used spirituous liquors moderately, but never to excess. He had up to the present illness been strong and rugged ; the only disease he ever had was syphilis, of which he gave the following history : In 1847 he had a sore on his penis, which remained several weeks ; it was accompanied by a bubo, which did not suppurate. His physician told him that he had syphilis, and gave him internal treatment for some time ; does not remember for how long, nor does he know what he took. He cannot remember having any cutaneous eruption until two years later, when a pustular eruption appeared, which left scars retaining a reddish-green color for some time. It recurred at intervals for two years, during which time he was treated for syphilis. In 1855, hard, roundish, bluish-red elevations occurred, (tubercular syphilides ?), which were very chronic, remaining a long time in spite of treatment. About this time, an offensive discharge from the right nostril commenced, and has continued ever since. In 1858 or 1859 nodes appeared on both shins. Had nocturnal pains from time to time until 1866. During this time he was treated for syphilis. From 1866 to 1870 he took no medicine. Nodes remaining, but causing no pain.

In 1870 he had his first attack of neuralgia ; it followed an exposure in cold, rainy weather, and since that time he has suffered with attacks of the same character up to the present time. He has taken many kinds of medicine, none of which gave him any relief, except opiates in large doses. He has taken no anti-syphilitic medicine for the neuralgia, every physician he consulted assuring him that syphilis had nothing to do with it.

When he came to my office he was suffering from a severe neuralgic attack. He stated that he had not slept for forty-eight hours, and that one-half grain doses of morphia sulphate every hour had failed to give relief. The pain came on in paroxysms at intervals of from three to five minutes, and would last from twenty to thirty seconds.

The paroxysms would come on without warning, often while the patient was talking. The least current of air would bring it on. The pain was agonizing, making him fairly writhe, while the face was contorted into terrible grimaces by uncontrollable spasm of the facial muscles of the right side. He would rub his face

hard with his hand until the pain stopped.   The pain began on the malar bone, rapidly extending throughout the entire region supplied by the trigeminus.

The usual tender points were found at the supra- and infra-orbital and mental foramina and in the malar region.   There was entire absence of taste and smell on the right side.   There seemed to be complete anæsthesia and analgesia on the right cheek, but these were not so marked on the forehead.

There was no paralysis.   The right cheek appeared drawn, as though the musles might be contracted.

He used the right cheek much less than the left in talking, but this was probably due to fear of producing pain.   His teeth were examined by a competent dentist and myself, and found to be sound.

In view of the undoubted syphilitic history, it was thought best to try anti-syphilitic treatment.

He was, accordingly, put upon the potassium iodide in 20 grain doses every four hours.   The next day he reported himself better, but still had some pain.   Two days later he was entirely free from pain.

He continued the potassium iodide in twenty grain doses with one-sixteenth grain hydrarg. bi-chlor. three times a day for about one month, when I lost sight of him.

On January 2, 1878, he came to my office suffering as severely as at first.   He stated that two nights previous he got very wet and from that time had suffered as he does now.   Before this he had suffered none since last report.   He was ordered to resume the potassium iodide the same as at first, (twenty grains every four hours).   On January 5th, he reported himself entirely relieved. The potasium iodide and hydrarg. bi-chlor. were continued as above.

January 24th, has had no pain since last report, the discharge from right nostril is a little more than usual.   Treatment continued.

February 16th, has a little pain of neuralgic character in lower jaw, but without spasm the last two days.   This is the only pain since last report.   He has improved much in general health, having gained twenty-eight pounds in weight since the first of January last.   Treatment continued as above.

Our patient again disappeared and I did not see him until May 27th.   He was suffering from pain and spasm, but it was not nearly as severe as before.   He had taken no medicine since last

report, having been entirely free from pain. I gave him fifteen grains of the potassium iodide every six hours, the attack being less severe I concluded to try a smaller dose.

May 30th, a little better, but still has some quite severe pain ; ordered him to double the dose.

June 1st, much better, but not entirely relieved.

June 4th, has two or three attacks a day not quite so severe.

June 7th, has had no pain to-day or yesterday, feels much better. Was put on the same treatment as above, which he continued for several weeks when he again disappeared.

Since last report he has had but two very slight attacks, not lasting over two hours and both passed off without treatment. He says he feels entirely well. If you will notice, the same drawn appearance of the right cheek remains, the cheek has entirely recovered its sensibility, and taste and smell are as good on the right side as on the left.

Remarks.—I think in this case, the diagnosis of neuralgia of syphilitic origin is justifiable. The unequivocal syphilitic history and the absence of rheumatism or other recognizable cause, together with the result of the treatment, render this diagnosis almost certain. I am aware that sometimes severe trigeminal neuralgias disappear for a time without treatment or known cause, (Anstie *On Neuralgia*, page 44). It is hardly probable however, that relief during anti-syphilic treatment could have been accidental three successive times.

The relief took place in each instance in about the time it requires to relieve other tertiary pains, and in the third relapse while a smaller quantity was given relief was incomplete, and when the dose was increased improvement soon followed.

Heubner, in speaking of the symptoms of syphilitic neuralgia, (*Ziemssen's Cyclopædia*, vol. xii, pages 357 and 362), says "with the exception of nocturnal exacerbations of pain there are no points of difference between this affection of the trigeminus and other non-syphilitic diseases of the nerve." And of diagnosis he says, "with regard to the peripheral nerves, when these are the seat of neuralgic affections, the principal weight must be laid upon the nocturnal appearance of the attacks." In this case there were no nocturnal exacerbations. I do not think the latter are essential to the diagnosis, since in many of these cases the connection of neuralgia with syphilis is merely accidental, and the symptoms are the same as would be produced by a similar interference with the function of the nerve by any other morbid process.

Bumstead in speaking of syphilitic neuralgia, (page 633), says, " the pain occasionally undergoing nocturnal exacerbations but not presenting any decided specific character, is the most frequent symptom."

The only case resembling this one, which I have been able to find in the books and journals to which I have had access, was one reported by Anstie to the Clinical Society of London in 1872 ; this was a case of neuralgia of the third division of the fifth pair, excited by syphilitic infection of a recent date. The patient was a man who had suffered with migraine on the same side on which neuralgia appeared. The tender points were the same as in ordinary neuralgia. There was unilateral facial anæsthesia, loss of taste and spasm of muscles.

The case was exactly like ordinary neuralgia not due to syphilis. It was also accompanied by paralysis of some facial muscles. The neuralgia was promptly relieved by potassium iodide thirty grains three times a day, but the paralysis was much more obstinate.

Later in the disease iritis was developed.

Some difference exists between authors as to the frequency of syphilitic neuralgia. Bumstead says (page 631) : " The affections of nerves met with in the secondary stage of syphilis consist chiefly of neuralgia." Fourier (*Lecons sur la Syphilis*, 1873, page 774) concludes that secondary syphilis is a tolerably frequent cause of neuralgia. Neither of these authors speak of the frequency of neuralgia from tertiary syphilis. Hammond mentions syphilis as " A very common cause of neuralgia." I think the statements of these authors would lead one to suppose it to be a more common factor than it really is. Erb (*Ziem. Cyc.* vol xi, page 31) warns us, with good reason, I think, not to confound neuralgia with the "*dolores osteocopi*" so common in syphilis. This error, I think, has led to the opinion that syphilitic neuralgia is of more common occurrence than it really is. The rarity of reported cases in the journals, and my own experience, lead me to regard the view of Anstie, which I quote below, as more nearly correct (Anstie *on Neuralgia*, page 175). " As regards the relation of the syphilitic dyscrasia to neuralgia, I agree in general with Eulenberg. 'Syphilis,' he says, 'may be the direct cause of neuralgia, either by the development of specific gummata in the nerve trunks or in the centre, or by arousing chronic irritative processes in the nerve sheaths, the membranes of the brain or spinal cord, or, especially in the bones and periosteum (syphilitic ostitis and peri-

ostitis)." The case of periostitis, however, is a doubtful one ; it may be questioned whether this affection ever gives rise to true neuralgia. Persons who are by inheritance highly predisposed to neuralgia, may, from the more general lowering of their health, produced by constitutional syphilis, become truly neuralgic simultaneously with, or subsequent to, the appearance of painful nodes on their bones. And as *regards the whole relation of syphilis to neuralgia, I must, from my own experience, conclude that the former is, after all, but rarely concerned in the production of the latter* (Italic my own). Syphilis has a strong specialty for producing limited *motor* paralysis, but a much weaker one for producing limited affections of the *sensory* system."

To localize the lesion in our case is quite difficult. Such a neuralgia might be caused by a lesion of the central origin of the nerve, by irritation of some of its peripheral branches, or by involvement of the nerve trunks. While it is possible, I do not think it at all probable that a lesion would confine itself to the origin of the fifth, and not affect any of the neighboring nerves.

Nor do I think such a profound anæsthesia and loss of taste and smell would be likely to accompany a neuralgia caused by irritation of the peripheral branches.

The disturbance of the ophthalmic division was much less than that of the other two. I do not think any lesion, external to the cranium, would be likely to affect so profoundly both the second and third divisions of the fifth. It seems to me, therefore, that it is by far the most probable that the lesion involved the nerve trunks of the superior and inferior maxillary divisions in their intra-cranial course. For it is possible for a lesion in the middle fossa of the skull to affect these without necessarily involving any other nerve.

While I was, at first, inclined to attach importance to the nasal discharge as a means of localizing the lesion, on more mature reflection I am inclined to think the discharge was produced by an altered condition of the Schneiderian membrane, caused by the interference with the function of the fifth nerve. To determine exactly what the lesion was, or whether it was one of those cases in which no palpable lesion can be found, is still more difficult.

The stage of the disease, together with the persistance of the symptoms, render the latter improbable.

Van Buren and Keyes (page 648) say : " It is common in cases of nervous syphilis occurring within a few weeks or months of the chancre, where death has ensued in consequence of nervous mal-

ady, or been occasioned by intercurrent diseases, to fail to dis-
cover any material lesion, whereas death from nervous syphilis
occurring late after general infection is almost uniformly, on au-
topsy, found to be connected with material lesions." The lesion
in this case may have been either of the three following, which
seem to me to be about equally probable :

Neuritis, caused by compression of the nerve in its intra-cranial
course by a gummatous tumor of the membrane, or infiltration of
the nerve extending from the same ; or, lastly, " A primary syph-
ilitic affection " of the nerve, that is, syphiloma or gumma of the
nerve, or syphilitic neuritis as described by Heubner (*Ziem. Cyc.*,
vol. xii, pages 352–4).
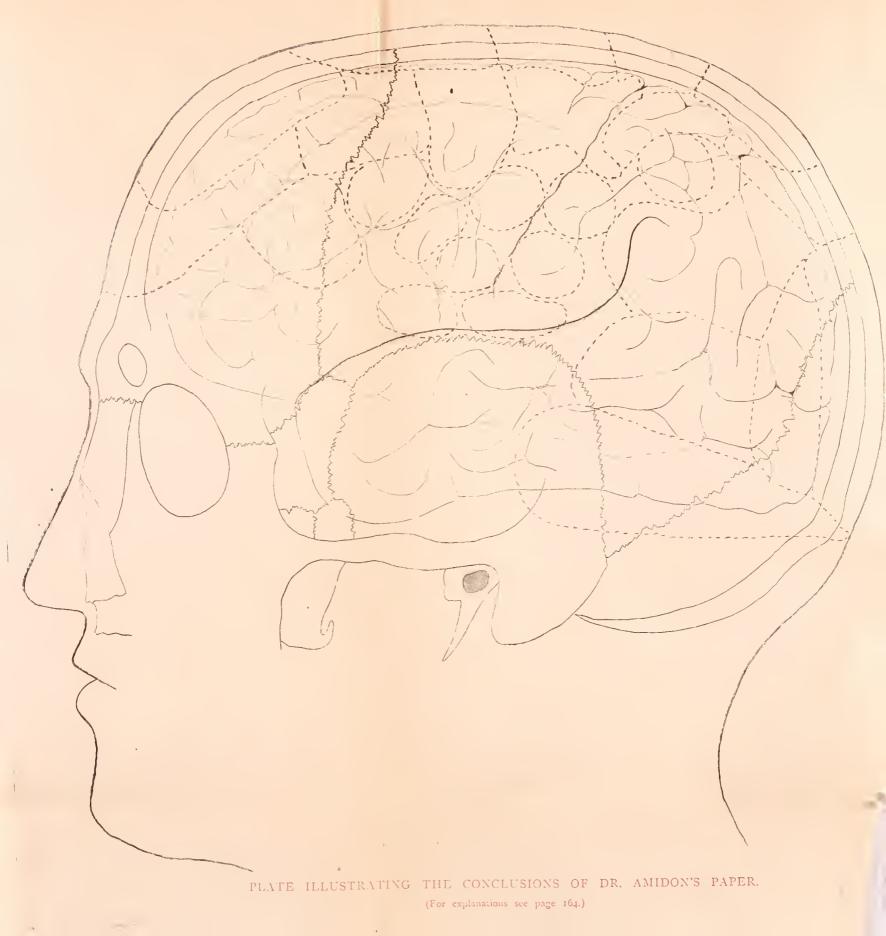
The case presents several points of great interest, which I will
merely mention. The absence of any family neurosis is import-
ant since such severe neuralgias rarely occur in those not predis-
posed (Anstie).

The anæsthesia is interesting in that it corroborates Anstie's
view that " Pain is not a true hyperæsthesia ; on the contrary, it
involves a lowering of true functions."

The loss of smell by disturbance of the function of the fifth,
corroborates what experimental physiology has already proven,
that section of the fifth nerve creates such changes in the Schnei-
derian membrane as to destroy the sense of smell.

So satisfactory a result of the treatment in a case of so long
standing could hardly have been expected. Not only was the
neuralgia completely cured, but there was a return of the function,
taste, smell and general sensibility being restored. It has now
been nearly eighteen months since the last attack.

PLATE ILLUSTRATING THE CONCLUSIONS OF DR. AMIDON'S PAPER.
(For explanations see page 164.)

ARCHIVES OF MEDICINE.

Original Articles.

THE EFFECT OF WILLED MUSCULAR MOVEMENTS ON THE TEMPERATURE OF THE HEAD: NEW STUDY OF CEREBRAL CORTICAL LOCALIZATION.

By R. W. AMIDON, A.M., M.D.

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Introduction.—As a preface to our investigations, and for their better comprehension, three rather modern branches of medical science must be briefly reviewed, viz., Cranio-Cerebral Topography, Cerebral Cortical Localization, and Cerebral Thermometry.

CRANIO-CEREBRAL TOPOGRAPHY.*

Although the grosser relationships between the brain and skull have for a long time attracted attention, it is only within the last few years that accurate data have been forthcoming as to the exact relations individual convolutions bear to their surrounding envelopes. Of the many methods pursued in studying cranio-cerebral topography, none insures such scientific accuracy and is so simple as that invented by Broca and used by many others.

The method consisted in drilling holes in the skull at fix-

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* See Bibliography.

ed points, inserting wooden pegs in the brain through these holes, and then removing the calvarium and dura mater. The pegs remaining imbedded in the cortex will show with exactitude the relations of direction and distance between the convolutions and points on the exterior of the skull.

The chapter in cranio-cerebral topography, which will be found of most utility for clinical and experimental purposes, is the part dealing with the relations borne by individual convolutions, not to the denuded skull, but to the external landmarks demonstrable on the living head.

To this part special attention will be paid, the facts being chiefly drawn from Broca, Féré and Turner, quoted also extensively by Seguin.*

To make all observations uniform, the head must have a constant position.   This position is that which is assumed by a skull, without the inferior maxilla, resting on its alveolar processes and occipital bone.   This is called the alveolo-condyloid plane, and forms the basis for all future measurements.   A perpendicular from this line passing through the external auditory meatus intersects the vertex at a point called the bregma.   This is called the auriculo-bregmatic line.   The most important landmark in the brain is the fissure of Rolando.   Its upper extremity lies 4.5 centimetres behind the bregma (Broca, Féré, etc.).   Its lower extremity falls about .5 centimetres behind the auriculo-bregmatic line, and a little above a line Féré draws through the head parallel to the basal plane, passing through the apex of the lambdoid suture and the superciliary ridge of the frontal bone.   (See Fig. 1.)

This would bring the lower end of the fissure of Rolando about 6 centimetres above and a little behind the external auditory canal.

Having thus located the fissure of Rolando enables us

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* See Bibliography.

to map out the neighboring convolutions, which are to-day held to be of the greatest importance, as they are supposed to contain the psycho-motor centres of the opposite half of the head, body and extremities.

The ascending parietal convolution will, of course, underlie the surface of the head just behind this region, while the ascending frontal is just in front.

The first or superior frontal convolution will be found commencing about 2.5 centimetres behind the bregma, and passing forward near the median line toward the orbit. The second frontal convolution will occupy a similar but more lateral position, while the third frontal convolution lies wholly in front of the auriculo-bregmatic line, and on a plane 5 centimetres above the external auditory meatus. Its folded or central part is about 2.5 centimetres in front of the auriculo-bregmatic line, or about 2 centimetres behind the external angular process of the frontal bone.

The tip of the sphenoidal lobe is 1 cm. behind the external angular process of the frontal bone, hence at this point the fissure of Sylvius commences.

The middle or horizontal part of the fissure coincides pretty nearly with the squamo-parietal suture, and hence falls near the fronto-lambdoidal line. The termination of the fissure is in the lower posterior parietal region, and this would bring the supra-marginal convolution under the parietal eminence (Turner) and the angular gyrus below and a little behind the same.

The occipital fissure varies very little from the commencement of the lambdoid suture, a point pretty easily made out in most heads. The relations of the fissure of Rolando to the antero-posterior diameter of the brain as determined by Féré are interesting. Its superior extremity is in the average 11.1 centimetres from the frontal extremity (range

from 9.5–12.5 cm.) and 4.9 cm. from the occipital extremity.

The lower extremity of the fissure is 7.1 centimetres from the frontal extremities (6.4–8.2 cm.) and 8.9 cm. (7.2–10) from the occipital extremity of the brain.

With such data as are contained in the above paragraphs at our disposal we can see the convolutions, so to speak, through the scalp, skull, and meninges.
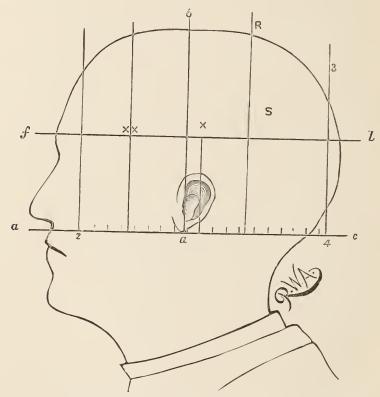
FIG. 1.—Outline of head, on which most of author's experiments were performed, reduced one-third, on which a modified system of Féré's lines are drawn. *A C*, alveolo-condyloid line ; *A B*, auriculo-bregmatic line ; *F L*, fronto-lambdoidal line ; 1, 2, frontal limit ; 3, 4, occipital limit of the brain. *R*, posterior extremity of the fissure of Rolando ; *X*, anterior extremity, same ; *XX*, location of the middle fold of the third frontal convolution, a little below and in front of which lies the tip of the sphenoidal lobe ; *S*, the posterior extremity of the fissure of Sylvius ; and the intersection of the lines 3, 4, and *F L* locates the occipital fissure.

CEREBRAL CORTICAL LOCALIZATION.*

To epitomize the present state of our knowledge on this subject, is indeed a difficult task.

For a branch of medicine which has been so short a time the subject of scientific investigation, its strides have been enormous, and its literature has become exceedingly voluminous. Our knowledge is based on two sets of facts, viz.: experimentation on living inferior animals, and close observation of pathological conditions (traumatisms, neoplasms, vascular disturbances, atrophies, etc.,) in the human subject.

Ferrier * Hitsig,* and Munk,* have, with a careful comparison of the relative anatomy of the two, transferred the results of their conclusive experiments from the brains of dogs and monkeys to that of man, and have laid out a map of psycho-motor centres which is now supported by a vast amount of clinico-pathological evidence.

In spite of numerous negative and contradictory facts, most observers will to-day hold to the assertion that there is a certain area of the human cortex which contains the psycho-motor centres for the opposite half of the body, and that there are certain other areas indefinite in extent and position, which are thought to possess a sensory or psychical function, or at least no motor attributes.

Let us now briefly review the facts at our disposal, gleaned from all authorities. A statement of the rather conservative view of localization is as follows:

The pre-frontal region is considered a psychical area, destructive lesions in animals and man causing no paralysis (?) but being often accompanied by changes of disposition and various morbid mental states. At the junction of the fissure of Rolando, and the superior longitudinal fissure, the angle in front holds centres for the upper, the angle behind centres for the lower extremity.

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* See Bibliography.

Lower down on the two ascending convolutions are centres for complex movements of the forearm, lower still (reaching the fissure of Sylvius) is the facial centre : anterior to which, and lower still on the third frontal and deeper gyri is the tongue and speech centre. The angular gyri or inferior parietal lobule are supposed to have some connection with the vision and ocular movements, while the rest of the cortex has, according to most accepted authorities, no motor function, but is the seat of general and special sensi-
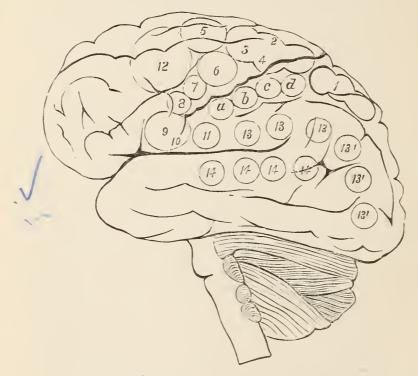
FIG. 2.—Location of centres in the human brain according to Ferrier.
1, centres for opposite leg and foot (locomotion.) 2, 3 and 4, for complex movements of the arms and legs. 5, for extension forward of arm and hand. 6, for hand and forearm, chiefly biceps, supination of hand and flexion of the forearm. 7 and 8, for elevators and depressors of the mouth. 9 and 10, for lips and tongue, as in articulation. 11, for platysma and retraction of angle of the mouth. 12, for lateral movements of head and eyes, elevation of eyelids and dilatation of the pupil. *a, b, c, d*, for hand and wrist. 13 and 13′ for vision. 14, hearing.

bility, viz.: centre for hearing just below that of vision, on
the posterior part of the superior temporal lobule ; centre
for smell in the gyrus uncinatus or subiculum cornu am-
monis, and near it a taste centre. Touch is also supposed
to occupy a centre at the base, and visceral sensations are
thought to lie in the occipital lobe.

An analytical, but more complex—and according to some,
fanciful location of motor centres, is given by Ferrier.

He endeavors to make the motor area larger, and attempts
analysis of centres into centres for particular movements or
muscle groups. That his motor area is not too large, nay,
not large enough, and that his subdivision of motor centres
is *not* fanciful, will be the burden of proof of the last and
original part of this paper. In justice to him I insert his
diagram and description in full.

CEREBRAL THERMOMETRY.*

Davy,* pp. 286 and 288, expresses himself surprised to
find the temperature of the brain in decapitated animals
lower than other parts, even the rectum. His mode of
procedure was to thrust the thermometer through the fora-
men magnum of decapitated animals into the different parts
of the encephalon. He found that the temperature of the
anterior region of the brain was lower than the posterior ;
the superficial lower than the deep substance, and all con-
siderably lower than that of the viscera and rectum. On
p, 326, while enumerating in detail his investigations in post
mortem temperatures in human subjects, dying from vari-
ous causes, while taking temperatures in the heart, blood,
stomach, liver, rectum, etc., in many cases he takes the
temperature of the cerebral mass and finds it $8°—10°$ F.!
lower than in the other organs. These results are rather
surprising to us who have naturally considered the brain as

* See Bibliography.

particularly well-warmed. Do not his experiments rather show that the brain quickly loses its heat by conduction and radiation?

Lombard * in his first experiments (1867), used a thermo-electric apparatus of such delicacy that a variation of less than $\frac{1}{1000}°$ F. was distinctly shown. One pile was attached to the head, while a second was applied to some peripheral part, as the thigh.

Even when at rest there were constant variations (ups and downs) in the temperature, but when his attention was aroused by anything there would be a rise of temperature in the head and a fall in the legs. In reading a stupid book there was a small rise, in reading an interesting one there was a marked rise, while reading aloud caused a still greater rise in the cephalic temperature. (This he considers not due to muscular effort.) A few minutes' recitation caused a much greater rise than several hours of deep thought. He obtained most marked results with the pile, just above the occipital protuberance. His greatest rise was $\frac{1}{20}°$ C., while there was sometimes a fall of $\frac{1}{4}°$ C.

In his second experiments * (1878), he tried both ordinary surface thermometers and his thermo-electric apparatus, and concludes that the former are not accurate because it is impossible with them sufficiently to compress the skin to produce a local anæmia which, after Schiff's criticism,† he considers essential to accuracy.

He considers also that there is almost always an inequality in the temperature of the two sides of the head, but thinks the higher temperature is as apt to be on one side as the other.

Lombard's last work † (1879), still on mental states, embody the results of sixty thousand experiments. These

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* See Bibliography.
† See p. 126.

demonstrate that small elevations of temperature (hundredths of a degree C. and F.), result from intellectual and emotional excitement.

Schiff's * experiments were carefully made and extremely interesting. The first series were made on dogs and other animals, in whom artificial respiration had to be kept up on account of the paralyzing effect of the curare administered to render the animals quiet.

In the skulls of animals thus quieted he drilled holes and plunged his thermo-electric needles directly into the brain, making the points of puncture on the two sides as symmetrical as possible. These elements he connected by wires to a galvanometric mirror apparatus, and thus, by oscillations of the mirror, to one side or the other, showing a greater rise in one hemisphere than in the other. Then, having the animal quiet and waiting till the galvanometric mirror was at rest, he gently irritated one of the extremities of the animal (by touching, pinching, or even galvanization of the sciatic). Immediately there was a deviation of the needle, which generally showed a greater rise of temperature on the hemisphere of the same side as the peripheral irritation.

He found the greater rise took place in the mid-parietal region, but does not state its exact amount.

Dissatisfied with the experiments on animals under curare he tried morphine as a quieter, but finding, in the brains of animals thus drugged, spontaneous fluctuations of temperature, he tried alcohol subcutaneously, and thus secured immobilization without stopping respiration.

Still not satisfied, he trephined dogs, rabbits and guinea-pigs, inserted his needles, and then allowed the animals sev-

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* See Bibliography.

eral days in which to recuperate, and then repeated his experiments on the effect of sensory impressions while the animals slept.

The result of these experiments was the same as that of the former. He also noticed slight fluctuations under the stimulus of the special senses of hearing, smell and sight.

His third series of experiments were on chickens, whose movements were mechanically restrained. Here he obtains similar results in irritation of the general or special senses.

In all his animals, he finds a psychical excitation causes the greatest fluctuations. Hence, in exciting a cat by the exhibition of tempting food, he gets a most marked rise, 18 degrees (?)* He thinks the rise is due to the activity of the nervous elements, not to increased vascularity. He criticises Lombard, pp. 460, 461, whose surface temperatures are greater than his own taken in the brain itself. He also asserts that variations in external temperature cease after section of the cervical sympathetic.

Broca's † experiments with the surface thermometer are more valuable. In his physiological experiments he found the average temperature of the left side of the head a trifle higher than that of the right.

In his pathological cases he found a rise of 2.5° C. over an acute softening, a rise of .4° C. in the left frontal, a rise of 1.7° C. in the left occipital, and a fall of .5° C. in the left temporal region in a case of right hemiplegia with aphasia, and in a case of embolism a fall of 4° over the embolic area.

More recently,† Broca has noticed a fall of 1.° C. in the left frontal, of 1.5° C. in the left temporal, and a smaller fall in the left occipital region in a case of hemiplegia with

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* Galvano metricocale.

† See Bibliography.

aphasia, due to embolism or thrombosis. He has also found a lowering of from 5° to 8° on the side of the head opposite the contraction of torticollis or wry neck.

The interesting investigations of Gray * are still fresh in our minds. He, besides further demonstrating the fact that when at rest the temperature of the left hemisphere is the higher, finds in one case after 10 minutes' reading, a rise of .50° F. in the right parietal region, in another a rise of .75° in the left parietal, and .50° in the right frontal region.

In a person after delivering a lecture, he found a fall of 1.67° F. in the left frontal and a rise of 2.5° F. in the left parietal region, while in the right frontal there was a rise of .67° F., in the right parietal a rise of 1.°, and of 2.5° at the right occipital, making a rise of .25° for the whole head—a rise of .98° for the left side, and a fall of .28° for the right.

In a second subject he found, after lecturing, a fall of .25° in the left frontal, 2.° in the left occipital, and a rise of .5° in the left parietal region, in the right frontal a rise of 1.°, and in the right occipital region a fall of .25°. Thus the left side showed an elevation of .69°, while the average rise of the whole head was 1.17° F.

He was also enabled to locate a tumor of the brain by finding a local rise of temperature.

Mills * noticed a small rise, .3° F., over a tumor of the frontal lobe, and also a rise over the right frontal lobe where a tumor existed at the base near that point.

Maragliano and Seppilli * have made many observations on the cerebral temperatures in the sane and insane.†

The highest temperature in the latter class was found in a case of furious mania, where the thermometer indicated 36.9° C., and in other forms of insanity lower temperatures, the lowest being in simple dementia, 36° C.

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* See Bibliography.

† The following account is compiled from the two translations.

In all mental diseases the occipital lobes have a lower temperature.   The temperature of the frontal lobes is higher in mania, in simple lypemania and dementia.

In progressive paralysis and lypemania agitata the parietal temperatures are higher.

They find the temperature of the two sides almost equal, and bearing a certain ratio to the variations of body temperature.

Their temperatures in sane persons are higher than those of Broca and Gray, for the simple reason that their observations were made in summer, while the latter experimented in winter time.

Mary Putnam Jacobi,* in a case of tubercular meningitis in a child, found an elevation of 3.29° F. above the normal in the right frontal region, when there was a softening of the first part of the first frontal convolution on that side, and also a rise of 6°–7°, F., above the normal, in both occipital stations, where there was found marked tuberculous inflammations of the pia mater, especially under the cerebellum.

THE INITIAL EXPERIMENT AND ITS DEDUCTIONS.

In the summer of 1879 it occurred to the writer that excessive use of a peripheral part (group of muscles) might generate sufficient heat in the cortical centre for that part to manifest itself to surface thermometers placed on the scalp.   To test this the surface thermometers were arranged in a strap passing over the vertex, where the center for the arm was thought to be, and after remaining on for fifteen minutes, the temperatures were recorded, and then violent flexion and extension of the right forearm was kept up for ten minutes, and the temperatures were again taken down, with the result of finding that a rise of over a degree (Fahrenheit) had taken place in the thermometers located

* See Bibliography.

over the centre for the arm on the left side of the head only. This result, although rather surprising, was not wholly unlooked for.

When the experiments were resumed in the winter of 1879, the following propositions were made their basis:

First. Marked local variations in the temperature of the cephalic contents can be demonstrated by surface thermometers (Broca, Gray, Maragliano, etc.)

[The fact that thermometric fluctuations, occurring on the surface of the head, have led observers to the diagnosis of subjacent cerebral lesions known to cause temperature variations (Broca, Gray, Mills, Putnam Jacobi, etc.) seems evidence enough that the heat of the brain can be transmitted through the dura mater, skull and scalp. To these facts we have added, however, the experiments of Maragliano on the cadaver, which demonstrated that the heat from warm water in the cranial cavity was transmitted through the cerebral envelopes in sufficient amount to affect surface thermometers.]

Second.—Cerebral cortical localization is now so far advanced as to warrant the assertion that the psycho-motor centres for one half the body occupy a certain area in the cerebral cortex of the opposite hemisphere.

Third.—Functional activity of an organ implies increased blood-supply and tissue-change, and consequent elevation of the temperature of that organ.

Fourth.—Willed contraction of muscles presupposes an increased activity of the volitional motor centre of those muscles in the cerebral cortex.

From the above propositions, it was very natural to make the deduction, that voluntary activity in a peripheral part causes a rise of temperature in the psycho-motor centre for that part which may be indicated by external cerebral thermometers.

APPLIANCES FOR EXPERIMENTATION AND SELECTION OF SUBJECTS.

The thermometers used in the following experiments were the self-registering Seguin surface thermometer* (having a flattened, circular reservoir), as modified by Gray, of Brooklyn. The chief modification claimed by Gray consists in a peculiar annealing or strengthening of the glass of the bulb to prevent its susceptibility to pressure. The thermometers are 11 cm. long, have a bulb 1 cm. in diameter, have a twist in the stem, to prevent the column of mercury from being lost, and are graduated in the Fahrenheit scale (a modification of doubtful utility) from 80°–100.° In the first experiments use was made of the perforated strap first used by E. Seguin† and modified by Gray for special use on the head. This mode of appliance was found entirely inadequate, for the reason that while it secured a good general distribution of thermometers, it was impossible with it to concentrate a number of thermometers in a small and peculiarly located area. A perforated sheet of felt was tried, but found unsatisfactory, and recourse was finally had to a quadrilateral piece of sheet rubber of sufficient elasticity to fit the convexity of the head, and stiff enough to tend to keep the thermometers erect. This piece of rubber is white, 21.5 cm. long, 14 cm. wide and almost 1.5 mm. thick. It is secured in position by means of perforated straps, sewed on two corners, and straps having buckles sewed on the opposite corners. By means of this appliance (open to immense improvement) numbers of thermometers may be brought in apposition with the surface of the head, and by holes punched in the rubber, you

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* E. Seguin. Human temperature and medical thermometers. New York, 1876.

† Loc. cit., p. 273 : "For continuous observations a belt with numerous holes the—diameter of the stem of the instrument can maintain the latter any length of time, and experiences may go on for hours or days without preoccupation or fatigue for the patient or the observer, wherever it is of interest to follow the differences and the variations of temperature apparently caused by disease, medication, overwork, study, etc.

can scatter the thermometers or concentrate them on some particular region.

The selection of a proper subject is of great importance to the success of the experiments. In the first place he should have a normal, well-shaped head ; good frontal angle, a smooth contour of the vertex and a well developed occiput, not brachy-cephalic or dolicho-cephalic, but the mean between the two.

In the second place the hair should be thin, or if not thin, close clipped. This precaution, although not absolutely necessary adds greatly to the ease and accuracy of the experiments, the temperature variations being quicker and greater where the layer of hair is thin.

In the third place the patient should have well developed and trained muscles, and if possible, should know their actions. The power of facial expression, especially of unilateral facial movements, and the ability to contract indivinual muscles, is of great desirability.

In the fourth place, it is of the greatest importance that the subject should be possessed of moderate intelligence, and be able to keep awake when remaining at rest.

In the fifth place an European, other things being equal, will be found more satisfactory than an African subject, and a man better than a woman.

PRECAUTIONS TO BE TAKEN AND SOURCES OF ERROR.

It is of the utmost necessity to be always on the lookout for sources of error, and hence a few of the most important ones will be pointed out, and a few simple rules laid down.

1. It is always better to make observations on a subject only after he has been a certain time at complete *bodily* rest. If however, experiments are performed after muscular exertion, as walking, etc., always make a note of the form of exertion and whether violent, continued, etc., etc.

2. The temperature of the surrounding air may lead to

the grossest errors. It is in this respect particularly, that the writer objects to the use of such a delicate instrument as the thermo-electric apparatus used by Lombard, Schiff, and Hammond. The accuracy of the ordinary surface thermometer, when covered by the cotton pad and leather strap (Gray's), will be seriously affected by the heat of a study lamp held within a meter, (variations of a degree F. and more having been noticed), while by ordinary gaslight, such variable results have been obtained as to show the utter worthlessness of experiments made with artificial light, unless extraordinary precautions are taken.

Rooms where there are currents of air, warm or cold, are unsafe for accuracy. If such slight causes affect a thermometer graduated to quarters of a degree, what can we say of the dependence to be placed on the indications of a thermometer showing fluctuations of one thousandth of a degree? Perhaps Lombard, by encasing his thermo-pile in ebonite and surrounding it with cotton, and then binding it so tightly on the head as to produce a local anæmia of the scalp may arrive at accurate results, but by pressure on the scalp he does not produce anæmia of the vessels of the diploë or dura mater, and so his thermo-pile may still be affected by vascular disturbances.

Lombard's experiments it is believed, were performed with excessive care and his results are thought to be perfectly accurate, and the variations in his temperatures are due to variations of temperature in the brain transmitted through its envelopes; nevertheless the extreme delicacy of the instrument, which makes it of so much value in careful hands, opens it to the most serious objections as an instrument for general and more careless use.

The most satisfactory results are obtained in a moderately cool room, 70° F., and particularly one of an equable temperature. Temperatures taken in a hot room, 85° F. and upward are useless, the variations are so small.

3. In experiments on the two sides of the same head, care must be taken to locate the thermometers similarly on the two sides.

4. Exert, in all experiments, as nearly as possible, an equal amount of pressure on the bulb.

5. See that the subject makes only one movement, or contracts only one muscle or group of muscles at a time,* and see that all these movements are vigorous, *willed* and contract the muscles forcibly. The importance of this rule is due to the fact that passive or flimsy movements produce no effect at all in the surface temperature of the head.

THE MODE OF PERFORMING AN EXPERIMENT.

The subject is placed at ease in a chair and the thermometers, with the pad of cotton over their bulbs, are thrust through openings in the rubber sheet and arranged at equal distances from each other in such a manner as to cover as much space as possible, and the whole is applied to the head by means of the straps and buckles.

The temperatures are recorded after from ten to fifteen minutes of quiet, and then the subject is directed to make some vigorous, willed movement, contraction of the biceps for example, for from five to ten minutes, and at the end of five minutes after the movements cease the temperatures are to be again recorded and compared with those taken before the movements. If a marked rise of temperature is noticed in any one of them the other thermometers must be brought together and concentrated about this spot so as to define the area over which the rise of temperature takes place as narrowly as possible. The process will be called that of concentration and the results will be localization. There will generally be found a small area over which the rises in temperature are large and constant and from which

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* Particular stress will be laid on this later.

they shade off gradually into the surrounding surface where there are no temperature changes.

One will soon learn to discard certain of the figures as he knows them to be indices of diffuse radiation of heat obliquely through the cerebral envelopes, from the active centre. Thus many rises of .25° to .50° F. may be ignored and only rises of .75° to 1.° and over recorded.

Much depends on the character of the muscular move- ments. If they are vigorous, and tonic and clonic spasms alternate, beautiful results are sometimes obtained and variations of 2° F. and more are seen.

THE MODE OF RECORDING EXPERIMENTS.

The mode of recording experiments is as follows: By means of Broca's stereograph or a shadow on the wall, transfer the outline of the head under study to paper. Make some copies of this and keep for recording future observations, and make a great many reduced copies (see Fig. 1) without Féré's lines, for the recording of individual experiments. Register the rises in temperature found, on the outline figure in a place which corresponds to its location on the head, designating its location by three measurements: first, the distance of the point from the median line of the head; second, the distance from this point, in the median line, to the root of the nose; third, the distance from the point where the temperature was taken, to the external auditory meatus. These three measurements being given, the point examined can be accurately located on the larger diagram of the head to be now described and of which Fig. 3 is a copy reduced one- third.

This diagram consists of a full-size profile view of the head, on which lines, a centimetre apart, are drawn having the meatus as a centre. The peripheral lines are made

FIG. 3.—DIAGRAM FOR RECORDING OBSERVATIONS ; ONE-THIRD NATURAL SIZE.

very close together in order to roughly represent, in perspective, the convexity of the head as it approaches the median line, which in the same diagram is divided into centimetres numbered from the root of the nose backward.

Having now the perpendicular distance of any point on the head to the median line, it is easily and accurately registered on this chart.

In the following experiments it was thought best to confine the observations almost entirely to one subject, and also to experiment chiefly on the left side of the head for the reason that the muscles on the right side were much better developed and more manageable. Several corroborative experiments on the opposite side and in other subjects will be introduced from time to time.

Among the first experiments performed, were those to locate the centre for the upper extremity. In these experiments, in which movements of the whole upper extremity were made, (flexion and extension of the fingers and forearm and some rotation of the shoulder), a rise of temperature, varying from .25°—2.75° F., was caused over a rather large area, extending on the median line from a point 14 cm. behind the root of the nose, about 10 cm. back on the same line, and laterally about 9 cm. from the median line. At this juncture it suggested itself that, for muscles which could be separately contracted at will, individual areas could be located, by repeated experiments and careful exclusion of sources of error. From this point on, much more care was exercised in the measurements and in the recording of results and a new source of error was discovered, which will receive attention under each separate heading, viz., the difficulty of contracting but one muscle or group of muscles at a time, and the readiness with which associated and even antagonistic muscles are brought into action.

METHOD OF ANALYSIS AND SUBDIVISION OF THE CENTRE FOR
THE UPPER EXTREMITY.

The large area in which there was noticed a rise of temperature following activity of the right upper extremity was sub-divided into smaller areas in the following manner. Prolonged and repeated contraction of the biceps caused a rise of temperature greatest near the median line, and about 19 cm. from the roof of the nose. This fact being ascertained, the thermometers were concentrated about this spot and an area was marked out about 3 cm. long and 5 cm. broad, near the median line of the head, extending from a point 17 cm. to a point 20 cm. behind the nose. (See

Plate.) This result was confirmed by four additional experiments and the boundary pretty clearly made out.

In supinating and flexing the forearm, the movement best adapted to bring about good contractions of the biceps, there are sources of error which must be guarded against. They are these: the supinator longus almost invariably contracts, it being a strong flexor as well as supinator of the forearm, and there is an involuntary tendency on the part of the subject to contract the flexors of the hand and fingers also. The best way to secure contraction of the biceps, is to have the patient bring his supinated wrist or forearm against some resisting surface, as under the edge of a heavy table or desk, and then make attempts to flex the forearm on the arm. Even then the supinator longus acts, but that is unavoidable.

In the experiments consisting in alternate flexion and extension of the forearm, a rise of temperature was noticed on an area including not only that just marked out for the biceps, but also in a region extending three or four centimetres farther back on the median line and of about the same width.

It was natural to presume that the rise of temperature in this region, was due to the contraction of the triceps in extension of the forearm, and several experiments on the triceps confirmed this supposition. The movements used to produce good contractions of the triceps were simple attempts at extension of the semi-flexed forearm, the movement being resisted by holding the patient's wrist or interposing some resistant object in his way. The results in these experiments were not so striking as in those on the biceps, for the simple reason that the triceps in the subject was not nearly so well developed as the biceps. The results were, however, sufficiently conclusive to define an area situated behind the biceps and covering a space

near the median line 3.5 cm. long and 6 cm. broad. (See
Plate.)

The next series of experiments were performed to de-
termine the location in which hand and wrist movements
cause an elevation of temperature. The conclusion deduced
from many experiments on movements of the hand and
fingers was that in an area, at about the same distance from
the nose, but farther from the median line than the brachial
area, a constant and quite marked elevation of tempera-
ture took place after continued and vigorous flexion and ex-
tension of the hand and fingers. After carefully laying out
this area on the graduated diagram, (see Fig. 3, p. 135), it
was remarked that its upper or median border overlapped
considerably the area already laid out for the biceps and
triceps. Here arose a difficulty not before met and which
presented itself from time to time all through the course of
experimentation. The questions which immediately arose
were : Do the centres for different muscles or groups of
muscles overlap in the cerebral cortex (as some suppose
they do) or is this apparent overlaping due to insufficient
care in limiting the muscular movements and also to the
oblique radiation of heat, already referred to, through the
cerebral coverings? A series of experiments proved the two
latter to be, in all probability, the factors in causing the ap-
parent overlapping of the centres.

In hand and finger movements, especially in strong
flexion, there was found in the subject a tendency to an in-
voluntary and rather feeble contraction of the biceps mus-
cle. When this error was corrected, by calling the subject's
attention to it and by having the forearm extended, the
overlapping of the two areas was much lessened.

When the thermometers were not left on quite so long
after the movements had been performed, that is to say,
giving time enough for the heat, at the point of its maxi-

mum intensity, to traverse the superincumbent tissues, but not allowing time for oblique radiation to take place, it was also found that the overlapping was very much diminished.

Bearing in mind these two precautions, and ignoring many doubtful and small elevations of temperature, the forearm and hand area was laid out, and now remained the more difficult task of dividing it.

The flexor group of the forearm was found to be best brought into action by flexion of the wrist and making the subject squeeze an elastic body, as a rubber bulb, in the hand. These experiments showed that the flexors of the wrist and fingers occupy the front part of the forearm area, an irregular tract about 3 cm. square, and lying alongside the biceps, about 6 cm. perpendicularly from a point on the median line 19 cm. from the nose (see Plate).

The extensors of the wrist and fingers and the interosseii occupied the posterior part of the forearm area a region about 4 cm. long and 2 cm. wide to the outer side and rather behind the triceps area.

It is of importance in experimenting on the flexors of the fingers to have the object grasped quite elastic, so as to enable the fingers to regain a semi-extended position, in order to be again flexed, without the contraction of the subject's extensor muscles. To accomplish this end, the rubber bulb of a syringe or Paquelin cautery was found very convenient.

In experiments on these parts, a curious physiological fact was brought out, viz., the necessity of the antagonistic contraction of the extensors of the wrist to secure the maximum power of the flexors of the fingers. It was demonstrated in this manner :

The common grasp of the subject's right hand, as shown by the dynamometer, was 26 kilogrammes.*

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* Author's dynamometer was graduated under his own supervision by Sted-withey the engineer of the New York Hospital, and is exact.

Date of Experiment	Movement or Muscle	Area of the Head													Average F.	Average C.
1879. Dec. 31.	R. Biceps	Parietal B	92.5	91.	92.	91.	90.75	90.75	91.5	91.		91.75	91.75	91.5	91.5	
" "	Triceps	b. sides.A	91.	91.25	91.25	91.75	90.75	91.		91.25	91.		91.75	92.	91.3	
	L.	R. B	89.5	93.5	89.	92.5	93.25	92.5		90.25	89.25	91.25	89.25	91.	91.	
	"	ParietalA	91.5	93.25	91.	90.25	89.25	92.5	88.75	87.		92.	92.	91.	91.	
1880. Jan. 13.	R.	L. B	93.5	91.75	92.	91.	92.75	92.75	93.5	92.5		90.5	91.25	92.1	92.1	
" 15.	Biceps.	ParietalA	93.75	92.25	92.25	92.	92.5	93.	93.5	92.75	92.75	92.25	92.6		92.6	
	R.	" B	91.25	90.5	91.	92.25	92.25	92.	92.	92.5	92.75	92.75	91.9		91.9	
	Biceps.	A	92.5	91.75	91.	92.25	93.25	92.	92.	94.	93.75	93.	92.5		92.5	
" "	R.	B	92.5	91.75	91.	92.25	93.25	92.	92.	94.	93.75	93.	92.5		92.5	
	Triceps.	A	93.	92.5	91.25	92.25	93.75	93.	92.5	94.	93.75	93.	92.9		92.9	
" 20.	R.	B	94.75	94.5	94.25	95.	95.	94.	94.75	94.	93.75				94.1	
	Biceps.	A	95.	95.	94.25	95.	95.	94.	95.25	94.5	94.				94.4	
" 21.	R.	B	91.	91.5	91.5	90.75	91.75	90.75	90.	90.5	91.25				91.	
	Triceps.	A	92.25	92.5	91.75	92.	92.75	91.	91.5	90.5	91.				91.5	
" 23.	R.	B	92.	91.5	92.	92.	92.5	91.	92.	90.25	91.				91.3	
	Biceps.	A	92.	92.	92.5	93.	93.	92.	92.75	90.5	91.25				91.9	
" "	R.	B	92.	92.	92.5	93.	93.	92.	92.75	90.5	91.25				92.2	
	Triceps.	2d A	92.75	92.75	93.	93.	93.25	92.	93.	90.5	91.5				92.4	
Feb. 19.	R.	subject. B	93.5	91.25	92.75	93.5	93.5	93.25	92.75	93.75	92.25				92.9	
	Triceps.	" A	94.	91.5	93.5	94.25	94.25	94.5	93.25	94.	92.5				93.3	
1879. Nov.19.	R. Biceps & Triceps	Negro. B	92.25	92.25	92.60	92.75	92.75	92.25	92.60						92.4	
" "	"	A	92.25	92.25	92.75	92.85	93.	92.5	92.75						92.6	
		Negro. B	91.5	91.75	92.5	91.5	91.75	91.5	92.						91.8	
		2d exp'tA	91.5	92.	92.5	91.5	92.25	92.	92.25						92.	
														Average all,	92.2	33.4
1880. Jan. 14.	Flexors Forearm.	L. B	92.75	92.	90.75	91.75	93.		93.5	92.5	93.5	93.5	92.25	92.4		
" 15.	"	ParietalA	93.5	93.	93.75	93.75	93.75	93.75	93.	94.	93.75	93.75	93.5			
	Exten- sion.	" B	91.25	91.75	90.75	91.75	92.75	91.	91.75	92.5	91.75	89.25	91.4			
		A	91.25	90.75	90.5	90.25	92.25	91.25	92.	92.5	91.75	91.	91.3			
" "	Flexors fingers.	" B	91.25	91.75	90.75	91.75	92.75	91.	91.75	92.5	91.75	89.25	91.4			
		A	91.25	91.75	90.75	92.25	92.75	91.75	92.	92.5	91.75	90.75	91.6			
" "	Flexors & Extens's.	" B	92.	92.5	91.75	91.5	93.	91.	91.	92.75	93.5	92.	92.1			
		A	92.5	93.	92.5	92.	93.25	92.	92.5	93.	93.75	92.25	92.6			
" 19.	Flexors.	" B	93.25	93.	92.5	93.25	93.	92.5	92.5	92.	93.	92.8				
		A	92.5	92.5	93.	93.	92.	92.25	93.	92.	93.	92.7				
" "	Extens's.	" B	92.5	92.5	93.	93.	92.	92.25	93.	92.	93.	92.7				
		A	91.75	93.5	93.	93.	93.	92.5	93.	92.	92.5	92.7				
" 20.	Flexors.	" B	90.25	91.5	92.	91.25	91.75	91.75	91.5	89.5	90.5	91.1				
		A	90.25	91.75	91.75	91.25	92.	91.	91.5	90.5	91.5	91.2				
" "	Extens's.	" B	90.5	92.25	92.5	91.25	92.25	91.75	92.25	90.75	91.	91.5				
		A	92.	91.5	92.25	92.	92.	90.75	92.	89.75	91.	91.4				
" "	Flexors.	" B	93.5	93.5	94.	94.	94.	93.25	94.	92.5	93.25	93.3				
		A	93.5	93.5	94.	94.	94.	93.5	94.	93.	93.5	93.6				
" "	Extens's.	" B	93.5	93.5	94.	94.	94.	93.5	94.	93.	93.5	93.6				
		A	94.5	94.25	94.	94.	94.25	94.	94.	93.5	93.5	94.				
" 22.	"	" B	90.75	91.	91.5	91.75	91.75	91.	92.25	91.	91.3					
		A	91.	91.	91.5	92.	91.5	91.75	92.75	91.5	90.5	91.5				
1879. Nov.23.	Flexors & Extens's.	R. B	92.	91.5	91.	92.	93.5	92.5	93.25	93.5	92.1					
		ParietalA	92.	92.	91.5	92.	93.5	93.	93.5	93.5	92.3					
		Negro.														
														Average all,	92.1	33.4

His hand was held in a semi-extended position, that being the one, as anyone can see for himself, in which the maximum grasping power is obtained. Causing him now to flex the hand and then grasp the dynamometer, a power of only 5 kilogrammes was exercised, a reduction of over four-fifths.

This fact is simply introduced as exemplifying one of the sources of error (see p. 131) to be guarded against. It is

not the proper place here to try and explain the cause of this variation. The existence, however, of this physiological antagonism tends to explain a certain overlapping of the flexor and extensor areas which would otherwise be confusing. There are many indications, but no positive proofs, that the area for the supinator longus lies between the flexor and the biceps, as the similarity of their action would favor the presumption of their proximity. Subjoined (p. 140) is a table of the temperatures taken in experiments on the upper extremity.

A DEMONSTRATION OF THE MODE OF SUBDIVISION OF A LARGE AREA INTO INDIVIDUAL AREAS.

Having gone in considerable detail over the mode of experimenting and the results of the experiments on the upper extremities, it is thought best to give a demonstration, by means of a diagram (see Fig. 4), of the mode of subdividing an area, corresponding to large groups of muscles, and, by means of the recorded results, the authority of drawing sharp lines of demarkation between separate areas.

The mode of procedure is as follows:

Rule a paper into square centimetres. Call one of these lines the median line of the head, and on it place numbers showing the distance, in centimetres, from the nose. Now take the diagrams (see Fig. 3) on which have been recorded the rises of temperature occurring in all experiments, and transfer them to the ruled diagram, placing alongside each elevation the initial of the muscle or group of muscles (*b* for biceps, *f* for flexors) whose contraction caused it.

After all temperatures have been transferred, a glance over the page will betray a more than accidental division of the region into several different areas in which there will be
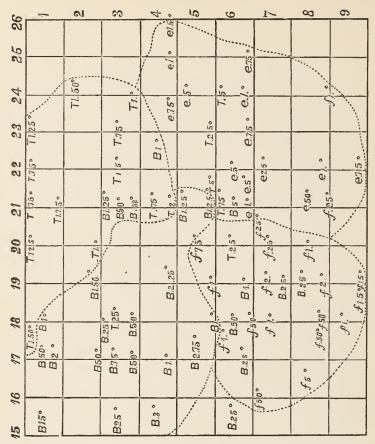
FIG. 4.—A diagram showing the elevation of temperature found in the experiments on the upper extremity, and also the mode of subdividing a large into smaller areas.

seen foci of high temperatures, evidently the areas which overlie individual centres. These foci will generally be found to shade off into each other by a gradual diminution in the magnitude of the rise, and a point is generally found which appears to be neutral ground, so to speak, and it is through this ground that a line of demarkation must be drawn.

These lines are not always easy to draw, however, and as an instance of this fact may be given the boundary line be-

tween the biceps and triceps. At a point, about 3 cm. per-
pendicularly distant from the point 21 cm. of the median
line, is seen a group of temperatures which read as follows :
B, 1.25°, .5°, .5°, (which means that elevations of those
amounts of Fahrenheit took place there subsequent to con-
tractions of the biceps), and T, .75° and 2°. Although the
biceps figures largely in this region, it is thought best to
enclose it within the tricep's boundary for the reason that a
a rise of 2° F. after the exercise of a weak muscle like the
triceps, in the subject, indicates more than a rise of 1.25° F.
after activity of a strong muscle like the biceps. The oc-
currence of such embarrassments is fortunately not com-
mon, and generally the line of demarkation can be easily
drawn.

EXPERIMENTS WITH SHOULDER MUSCLES.

In the experiments performed on the upper extremity
as a whole, including some shoulder movements, eleva-
tions of temperature were noticed over a greater surface
than the area that has just been laid out as belonging to
the arm, forearm and hand.

The posterior boundary was the same in both, but in the
former series of experiments there was noticed a rise of tem-
perature in front of the biceps area. It occurred to the
writer that here might be located areas for the shoulder
muscles, and so experiments were performed which fully
confirmed this supposition.

The complexity of movements inherent in a ball-and-
socket joint, like the shoulder, abduction, adduction and
circumduction of the arm, elevation, depression, propulsion
and retraction of the scapula plunged the experimenter
into such a maze that a clear, definite result was almost
dispaired of. Frequent repetition of experiments, and care-
ful sifting of results, however, at length brought compara-
tive order out of the seeming chaos.

General movements of the shoulder joint and scapula were found to cause an elevation of temperature over a very large surface, being anterior to the area for the arm, approaching very nearly the supra-orbital ridge in front, and extending laterally over a region 8 or 9 cm. broad.

The deltoid, it being nearer the arm muscles aleady located, was first selected for experiment. It was brought into action by abducting the extended arm and hand sometimes with and sometimes without a light weight in the hand, or hung on the forearm. The subject must be watched lest, in this experiment he contract some arm or forearm muscle. The rises of temperature after this movement commenced at the biceps area, and extended some distance forward next the median line. It was now noticed that this movement, intended to contract the deltoid alone, brought into action the upper part of the trapezius and the levator anguli scapulæ which two muscles fixed the scapula, when the deltoid, taking this as its fixed point, contracted and raised the arm.

To mark out the area for the deltoid, it would then be necessary to strike off from the larger area the part on which rises of temperature occurred from contraction of the upper part of the trapezius and the levator anguli scapulæ.

Simple elevation of the scapula, shrugging the shoulder, which brought these latter muscles into action, produced a rise of temperature in the anterior part of this region leaving a space 5 cm. long and 4.–5 cm. broad as the deltoid area, extending from the biceps area forward on the median line to within 13 cm. of the nose. This area was narrower in front than behind, the highest temperatures being found near the median line of the head.

In determining the area for the deltoid, the location of the area for the upper part of the trapezius and levator

anguli scapulæ were pretty well defined, but numerous experiments were superadded to insure certainty. The movement used was simple elevation of the shoulder (as in shrugging), the arm hanging limp.

More marked results were obtained by resisting the movement by putting the subject under some fixed object, as a mantle shelf, and making him attempt lifting the same. The head must be held still in these experiments to offer a fixed point for the muscles involved.

Rises of temperature followed over a rather large space extending along the median line from the anterior margin of the area for the deltoid, to within 5 or 6 cm. of the nose, and being 6 to 6.5 cm. broad.

In experiments on the pectoralis major, the arm being adducted, carried across the chest, and the shoulder depressed, rises of temperature were seen in an area situated between those already marked out for the trapezius and deltoid external to both. This area was about 3 cm. long and 3–4 cm. wide opposite a point on the median line, 14 cm. from the nose. There was found to be considerable overlapping of the areas for the deltoid and pectoralis, which is accounted for probably by the fact that the anterior fibres of the deltoid enter quite largely into the above movement.

In depression of the scapula, calling into action the muscles used in supporting the body on crutches, there was an elevation of temperature over a large area, partly allotted already to the trapezius and pectoralis major. In having the subject depress and slightly retract the shoulder, so as to prevent the action of the pectoralis major, the most marked elevation of temperature took place in an area immediately behind that for the pectoralis major, and of about equal size. This was allotted to the latissimus dorsi, that being the muscle most involved in this movement.

The elevations of temperature occurring in depression of the shoulder over the area for the trapezius, is explained by the part the lower fibres of this muscle play in this movement. The distribution of these rises, however, did not coincide exactly with the area already laid out for the upper part of the trapezius, but extended more laterally.

Horizotal retraction of the shoulder, and contraction of the middle part of the trapezius and the rhomboids, caused a rise of temperature in an area overlapping that for the upper part of the trapezius, but extending farther forward in the median line.

There is thus marked out a large area, 9 cm. long and 4.–7 cm. broad, which may be called the trapezius area, although lost in this tract somewhere are probably the areas for the levator anguli scapulæ and the rhomboids. It will be noticed that this area comes forward to within 3 cm. of the nose. An area for the serratus magnus could not be located because the muscle cannot be contracted singly. Judging, however, from its action, pulling the scapula forward, and drawing the lower angle forward, tending to raise the apex of the shoulder, it would seem likely to occupy an area near that of the trapezius and pectoralis major, and perhaps it is located partially on the space already assigned to them. (See Table on p. 147.)

Experiments on movements of the head and neck early occupied the writer's attention. The extreme complexity of the movements and the multitude of muscles involved in them, were for a long time the source of great bewilderment, but a careful analysis of the movements and muscles involved soon afforded a partial solution. So much difficulty was experienced in disentangling the facts deduced from these experiments, that a brief analysis of them will perhaps be pardoned.

Movements of the head alone must be kept distinct from

Date of Experim't	Movement or Muscle	Area of Head												Average F.	Average C.
1879. Jan. 13.	Shoulder	Later'l B	93.5	93.	93.		91.75	92.75	92.75	93.25	93.		92.	92.25	92.75	
Jan. 13.	"	frontal A	93.5	93.	93.	92.5	92.75	93.	93.25	93.	92.5		92.5		92.9	
" 15.	"	B	91.	91.75	92.	91.75	92.5	91.5	92.	99.75	92.		92.		91.77	
1880.		A	91.25	91.75	92.	91.75	93.	92.	92.	91.5	92.		92.5		91.97	
Jan. 16.	Elevators of S.	B	89.	89.5	89.	90.	91.5	91.	91.5	88.5	90.25	90.5			90.2	
"	"	A	89.75	89.5	89.	90.25	91.5	91.	91.5	89.5	90.25	90.5			90.4	
" "	Pectoralis Major	B	89.75	89.5	89.	90.25	91.5	91.	91.5	89.5	90.25	90.5			90.4	
" "	Retract'n	A	91.	92.	91.	91.5	91.75	91.	91.5	91.75	90.25	90.5			91.4	
" "		B	91.	92.	91.	91.5	91.75	91.	91.5	91.75	90.25	90.5			91.4	
" "	Adduct'rs	A	91.	92.	91.	91.5	92.5	92.25	91.5	91.75	90.25	90.5			91.4	
" "		B	91.	92.	91.	91.5	92.5	92.25	91.5	91.75	90.25	90.5			91.4	
		A	91.	92.	91.	91.75	92.5	92.25	91.5	91.75	90.25	90.75			91.4	
Jan. 22.	Deltoid	B	91.25	91.5	90.75	90.5	90.75	89.25	90.25	90.	89.25				90.3	
" "	Elev'rs of Shoulder	A	90.5	92.	90.25	90.5	90.5	89.5	90.5	89.5	91.25				90.5	
" "		B	90.75	92.	90.75	90.	90.25	89.5	89.5	89.25	89.25				90.1	
" "	Pectoralis Major	A	91.25	91.5	90.75	90.5	90.75	89.25	90.25	90.	89.25				90.5	
		B	91.25	91.5	90.75	90.5	90.75	89.25	90.25	89.25					90.5	
		A	90.75	91.75	91.5	90.5	91.25	89.25	88.75	90.	90.5				90.5	
Jan. 23.	Deltoid	B	91.	92.	91.5	91.	92.25	91.75	91.5	91.5	93.75				91.9	
" "	"	A	92.	92.	92.	91.5	92.5	92.	91.75	92.5	93.75				92.2	
" "	Elevation Shoulder	B	92.75	92.75	93.	93.	93.25	92.	93.	90.5	91.5				92.4	
" "		A	93.	93.	93.	93.5	93.5	92.	91.	92.					92.8	
" "	Pectoralis Major	B	90.5	91.25	91.	90.5	91.75	91.	90.5	91.5	93.				91.2	
" "		A	91.	92.	91.5	91.5	92.25	91.75	91.5	92.5	93.75				91.9	
" 24.	Deltoid	B	92.	92.	92.	91.5	92.5	92.	91.75	92.5	93.75				92.2	
" "	Elevation Shoulder	A	92.25	92.5	92.25	91.5	93.	92.	92.25	93.	94.				92.5	
" "		B	90.75	92.	91.5	91.	90.	89.5	90.25	89.75	90.5				90.5	
" "		A	91.25	92.5	92.	91.75	90.75	90.	91.5	90.5	90.5				91.	
" 25.	"	B	91.5	92.	92.	92.	93.5	91.	92.	92.5	93.5				92.2	
		A	92.25	92.5	92.5	92.25	94.25	91.5	93.	93.25	93.5				92.8	
		B	91.25	92.5	92.	91.75	90.75	90.	91.5	90.5	90.5				91.	
		A	91.25	92.5	92.	91.75	90.75	90.	91.5	90.5	90.5				91.	
" 25.	"	B	89.	90.	89.5	89.25	91.	89.	90.	91.5	92.				90.1	
		A	89.25	91.	90.75	91.	92.25	90.5	90.75	92.5	93.				91.1	
" 27.	Pectoralis Major	B	91.5	92.	92.25	91.5	89.75	91.5	92.	93.	93.5				91.9	
		A	92.25	93.	92.5	92.25	89.75	92.5	92.75	93.25	94.25				92.5	
" "	Depress'n Shoulder	B	92.	92.5	92.5	92.	92.	91.25	92.5	92.75	91.5				92.1	
		A	92.	92.75	92.75	92.5	92.	91.25	92.75	93.	91.75				92.3	
" "	Retract'n Shoulder	B	91.5	92.	91.5	91.5	91.75	90.75	92.	92.5	91.				91.6	
		A	92.	92.5	92.5	92.	92.	91.25	92.5	92.75	91.5				92.1	
" 30.	Pectoralis Major	B	90.25	90.5	89.	91.	89.	88.	91.	91.5	89.5				89.9	
		A	92.	91.25	90.	90.75	88.5	89.75	91.25	92.25	90.75				90.7	
" 31.	Elevation Shoulder	B	92.	92.75	93.	92.5	93.5	90.	93.25	93.5	94.5				92.7	
		A	92.5	93.	93.25	92.5	93.75	91.25	93.5	94.	94.75				93.1	
" "	Retract'n Shoulder	B	92.5	93.	93.25	92.5	93.75	91.25	93.5	94.	94.75				93.1	
		A	92.5	93.25	93.25	93.	94.	91.75	93.75	94.	94.75				93.3	
" "		B	91.25	92.	92.25	91.5	93.	89.25	93.	93.25	94.25				92.1	
		A	92.	92.75	93.	92.5	93.5	90.	93.25	93.5	94.5				92.7	
Feb. 2.	Pectoralis Major	B	91.75	91.5	90.5	91.	92.	89.5	90.	90.	91.5				90.8	
		A	92.	91.75	90.75	91.	92.	90.	90.	89.75	91.5				90.9	
" "	Depress'n Shoulder	B	90.5	90.5	89.5	91.	91.5	89.5	89.	89.	91.				90.	
		A	91.75	91.5	90.5	91.	92.	89.5	90.	90.	91.5				90.6	
" 4.	Elevation Shoulder	B	91.5	91.25	92.75	93.5	93.25	93.	93.5	94.75	93.				92.9	
		A	91.5	91.25	92.75	93.5	93.5	93.	93.5	94.75	93.25				93.	
" 7.	Pectoralis Major	B	93.	94.	92.5	92.5	92.75	93.5	91.	92.5	91.5				92.5	
		A	93.5	94.25	93.5	93.25	93.25	93.5	92.	93.	92.25				93.1	
" "	Depress'n Shoulder	B	93.5	94.25	93.5	93.25	93.25	93.5	92.	93.5	92.25				93.1	
		A	93.75	94.25	93.75	93.25	93.5	93.5	92.	93.5	92.25				93.1	
" 11.	"	B	92.75	93.25	93.25	92.	92.	94.	92.25	92.5	93.25				92.7	
		A	93.75	94.25	94.25	93.	93.	94.5	93.	93.25	94.				93.6	
														Average,	91.9	33.3

movements of the head and neck. The movements of the head alone are confined to nodding, and those of the head and atlas to rotation.

The head is pulled forward by the recti capitis antici

and the hyoid group of muscles, backward by the trapezius, complexus, splenius capitis and other powerful muscles at the back of the neck, while rotation of the head is caused by the oblique and unilateral action of the muscles which pull the head forward and backward.

Movements of the head and neck as a whole, however, bring into action more muscles. The head and neck are bent forward, not only by the muscles already named as bending the head, but also by the sterno-mastoids, scaleni and longus colli. Lateral movements of the head and neck are caused by the trapezius, levator anguli scapulæ, etc., while extension of the head and neck, as of the head alone, is caused chiefly by the trapezius, complexus, splenius, etc., etc.

In general movements of head and neck, nodding, rotary and lateral, temperature changes were noticed over a considerable area in the lateral frontal region more remote from the median line than the shoulder region already mapped out.

Forced extension of the head and neck, sometimes directly back, at other times toward the right side, produced elevations of temperature in two places: first in the anterior frontal region assigned to the trapezius and levator anguli scapulæ, and second in the lateral frontal region over a small area, external to that of the pectoralis major, opposite a point on the median line, about 14.5 cm. from the nose. This area is about 3 cm. long and 1.5–2 cm. wide. In or near this area are noticed also the elevations of temperature occurring in rotary movements of the head, so this spot is designated as the area for the deep extensors and rotators of the head, the action of the superficial muscles (trapezius, etc.) having its index in the rise of temperature which occurs over the trapezius area.

Ante-flexion of the head and neck so as to bring the chin

forcibly against the chest, or better still, if the forehead be firmly pressed against some resistant body, caused a marked but rather diffuse rise of temperature in this latero-frontal region. After a great many experiments there were found to be in this area, three foci where the rises of temperature were always most marked,—one 8–9 cm. laterally from a point on the median line 16 cm. from the nose, another the same distance from the median line, 10 cm. from the nose, and the third about 10 cm. perpendicularly from a point on the median line 13 cm. from the nose. The latter district was about 8 cm. above and in front of the meatus auditorius externus.

There were also elevations, sometimes quite large, over the area where the pectoralis major had been located. How were these conflicting results to be harmonized? It was accidentally discovered that in forcible ante-flexion of the head and neck there was contraction of the pectoralis major, this taking place in order to steady the shoulder and fix the clavicle, upon which some traction was made by the sterno-cleido-mastoid.

This occurrence being pretty constant the rises of temperature found over the area for the pectoralis major were ignored. But how apportion the other three regions?

In this movement three sets of muscles are involved, viz., the hyoid group, the deep cervical group (longus colli, recti and scaleni) and the sterno-mastoids. In simple flexion of the head on the neck the sterno-mastoids are not used. Several experiments on this movement alone showed marked rises in the two higher, only, of the foci mentioned above. This would point to the lower as the region for the sterno-mastoid, and this was confirmed by several experiments on the sterno-mastoid alone, the head being rotated to the opposite side and the chin slightly elevated. The results confirmed the supposition that the lower of these

three areas belonged to the sterno-cleido-mastoid muscle. The elevations of temperature following movements of the tongue, to be described later, were found to occupy about the same location as the posterior of the two upper areas.

The same statement holds good as to the results of experiments on the depressors of the lower jaw, and for these two reasons this area was allotted to the hyoid group of muscles.

This arrangement would leave the anterior and larger region as the location of the area for the deep, anterior cervical muscles. This view is strengthened by the fact that this group contains the scaleni which would be quite

Date.	Movement or Muscle.	Region of the Head.														Average F.	Average C.
1880. Jan. 29.	Head and neck forward.	Lateral frontal.	B	92.	92.	91.5	92.	91.75	90.5	93.25	92.		89.75			91.6	
" 31.		"	A	93.	92.	91.75	92.5	91.5	92.	93.25	93.75	91.				92.3	
" 31.			B	92.5	91.25	92.5	92.	90.5	91.25	92.	92.	91.				91.6	
			A	93.	92.25	93.5	92.25	90.5	92.	92.5	93.	91.				92.2	
" 16.	"	"	B	92.	90.25	91.	90.5	92.25	92.25	91.5	92.	92.75	92.25			91.4	
			A	92.	90.25	91.	91.5	92.25	92.25	92.		93.25	92.25			91.9	
" "	Head to right side.	"	B	92.	90.25	91.	91.5	92.25	92.25	92.25	92.	93.25	92.25			91.9	
" "		"	A	92.	90.25	91.	91.75	92.25	92.25	92.25	92.25	93.25	92.25			91.9	
			B	92.	90.25	91.	91.75	92.25	92.25	92.25	92.25	93.25	92.25			91.9	
" "	Back & to right side.	"	A	92.	91.75	91.	92.5	92.25	92.25	92.25	92.25	93.25	92.25			92.1	
			B	92.	91.75	91.	92.5	92.25	92.25	92.25	92.25	93.25	92.25			92.1	
" "	Rotation to right.	"	A	92.	92.5	92.25	94.5	92.25	92.25	92.25	92.25	93.25	94.25			92.7	
			B	92.	92.5	92.25	94.5	92.25	92.25	92.25	92.25	93.25	94.25			92.7	
" "	Rotation to left.	"	A	92.	92.5	92.25	94.5	92.25	92.25	92.25	92.25	93.25	94.25			92.7	
			B	92.	92.5	92.25	94.5	92.25	92.25	92.25	92.25	93.25	94.25			92.7	
			A	92.	92.5	92.5	94.5	92.5	92.25	92.5		92.25	93.25	94.25		92.7	
Feb. 4.	Head and neck forward.	"	B	92.	92.5	93.75	93.75	91.	91.5	92.75	94.		93.75			92.9	
			A	92.5	93.5	94.25	94.75	92.	92.5	93.75	94.		94.5			93.5	
" 5.		"	B	92.75	93.25	93.	92.	93.	92.75	91.5	93.		92.			92.5	
			A	93.	93.5	93.	92.	93.	93.	91.5	93.		92.			92.6	
" 14.	"	"	B	94.5	94.5	94.25	94.	94.5	95.	94.	94.		95.			94.4	
			A	94.75	94.5	94.5	94.	94.5	95.25	94.25	94.25		95.5			94.6	
" 17.	"	"	B	94.25	93.75	93.	93.75	93.	92.5	93.	93.		93.			93.2	
			A	94.25	93.75	93.75	93.75	93.	93.	93.25	93.25		93.25			93.4	
" 5.	Sterno-mastoids.	"	B	91.	92.5	92.	91.	92.25	92.	90.75	92.5		91.5			91.7	
			A	92.75	93.25	93.	92.	93.	92.75	91.75	93.		92.			92.6	
" 14.	"	"	B	94.	94.	93.75	93.5	94.	94.	93.5	93.5		94.25			93.8	
			A	94.5	94.5	94.25	94.	94.5	95.	94.	94.		94.75			94.4	
" 19.	"	"	B	93.75	94.5	94.	94.25	95.	94.5	94.25	94.75		95.5			94.5	
			A	93.75	94.75	94.	94.5	95.25	95.	95.	95.25		95.75			94.8	
Jan. 29.	Head to right side.	"	B	92.5	92.75	90.75	92.75	91.25	92.	92.5	93.		92.			92.1	
			A	92.5	92.5	92.	92.75	91.	91.	93.25	93.5		90.75			92.1	
" 14.	"	"	B	91.75	89.75	90.25	92.5	92.5	90.75	89.25	93.		91.75	92.		91.3	
			A	91.75	88.75	91.5	92.5	92.5	91.5	91.25	93.		92.	92.		91.6	
" "	Head backw'd.	"	B	91.5	91.25	91.25	91.	92.	90.75	90.25	91.5		90.5	90.75		91.0	
			A	91.	91.	91.25	92.	92.	90.75	90.5	91.5		90.5	91.		91.2	
" 31.	"	"	B	93.	92.25	93.5	92.25	90.5	92.	92.5	93.		91.			92.2	
			A	93.5	91.	93.5	92.75	91.5	92.	92.75	93.		91.			92.3	
Feb. 18.	"	"	B	93.	94.	93.75	94.5	95.	94.	94.75	94.5		95.			94.2	
			A	93.5	94.5	94.	94.5	95.	94.25	94.75	94.5		95.			94.2	
															Average,	92.6	33.7

naturally sought near the other muscles of forced in-
spiration, viz., the elevators of the shoulder and the
pectoralis major.

EXPERIMENTS ON THE LOWER EXTREMITY.

Judging from the order in which the areas for the upper
extremity were developed, the posterior part of the head
was naturally looked to as the place where elevations of
temperature would be found following activity of the lower
extremity.

It was found that general movements of the leg and
thigh caused an elevation of temperature over an area of
indefinite extent lying behind that of the upper extremity.

The movement of flexing the foot on the leg and ex-
tending the toes, *i.e.*, contraction of the anterior tibial
and part of the peroneal group of muscles caused an eleva-
tion of temperature in an area 4 cm. long and about 5 cm.
wide, lying next the median line immediately behind the
area for the triceps. This area also abutted against and
overlapped the area for the extensors of the forearm. (See
plate.)

The movement best adapted for this experiment, the
subject sitting in a chair, was found to be a simple forcible
elevation of the foot and toes—the heel remaining on the
floor.

Extension of the foot on the leg and flexion of the toes,
i.e., contraction of the calf muscles, caused a rise of tem-
perature over an area, behind the anterior tibial, 2.5 cm. long
on the median line, 5 cm. broad and sending a prolongation
1 cm. broad outside of the anterior tibial region as far for-
ward as the area for the extensors of the forearm. The
movement made was simple extension of the foot on the
. leg, the toe remaining on the floor. Better results were
obtained when a weight was placed on the knee. The
rises marked in some of these experiments were quite

Date.	Movement or Muscle.	Area of Head.												Average F.	Average C.
1880. Jan. 1.	R. Leg.	L. Post. B	91.	91.5	90.	85.5	89.5	90.5	90.5	89.	91.5	91.75	90.		
" "		Parietal A	91.25	92.	90.75	85.5	89.5	91.	90.75	88.75	90.25	92.5		90.2	
" "	L. Leg.	R. " B	89.5	89.	89.25	89.75	89.75	88.	89.5	88.5	90.	88.75	89.2		
		A	89.5	88.5	89.	89.75	89.75	88.5	89.5	90.25	90.5	90.		89.4	
" 13.	R. Ant. Tibials.	L. " B	93.5	92.	92.25	91.5	92.75	93.	92.5	92.	91.75	92.5	92.3		
		A	93.	93.5	92.75	91.25	92.	92.75	93.25	93.25	92.25	91.5		92.3	
" 17.	"	" B	91.25	93.25	91.5	92.	90.5	90.75	91.5	90.5	90.25		91.2		
		A	91.25	93.25	92.25	92.		91.5	91.75	91.5	90.25			91.7	
" "	R. Calf.	" B	91.25	93.25	92.25	92.		91.5	91.75	91.5	90.25		92.		
		A	91.25	93.25	92.25	92.		91.5	91.75	91.5	91.25				
" 19.	"	" B	92.75	94.	93.5	94.5	94.25	93.	94.5	94.	93.		93.7		
		A	93.5	94.75	93.75	94.75	94.75	93.5	94.75	94.25	94.25			94.2	
" "	R. Ant. Tibials.	" B	93.5	94.75	93.75	94.75	94.75	93.5	94.75	94.25	94.25		94.5		
" 20.	R. Calf.	" A	93.75	94.75	93.75	95.25	94.75	93.75	95.	94.5	94.5			94.5	
		B	90.75	92.25	92.25	92.		92.75	90.75	91.75	91.5	91.75	91.7		
" "	"	" A	91.5	93.	93.	91.75	93.	91.75	92.	91.	91.		92.		
		B	92.	92.	92.	91.5	92.25	90.25	91.5	90.5	90.5			91.1	
" "	"	" A	91.	92.	92.	91.5	92.5	89.75	91.5	90.5	91.			91.3	
		B	91.	92.	92.	91.5	92.5	89.75	91.5	90.5	91.				
" 24.	"	" A	91.	92.5	92.	92.5	92.5	91.5	91.75	91.	90.75		91.7		
		B	91.25	91.5	91.	91.25	91.	90.	91.75	90.5	90.			90.9	
" 29.	"	" A	91.25	92.	92.25	92.	92.	90.75	92.75	91.5	91.5		91.5		
		B	93.5	93.5	93.75	91.75	92.	90.75	92.75	92.5	91.			92.5	
" "	R. Ant. Tibials.	" A	92.25	93.	93.75	93.25	92.75	91.	92.5	92.75	91.5		92.		
		B	92.25	93.	92.25	92.25	93.25	92.	92.5	91.25	91.			92.1	
" 31.	"	" A	92.25	93.	92.75	92.25	93.25	92.	92.5	91.25	91.5		92.3		
		Negro. B	91.	93.	92.75	92.		92.75	90.75	91.75	91.25	91.75	91.9		
1879. Nov. 28.	"	Negro. A	92.5	93.	92.75	92.		92.75	90.75	92.	91.5	91.75	92.1		
" "		R. " B	95.	95.25	94.5	95.25	94.75	95.	95.75	94.5	94.75	95.	94.9		
	L. Calf.	A	95.	95.25	94.5	95.25	94.75	95.	96.	95.	96.	95.		95.	
		B	95.25	96.	94.75	96.	95.	95.25	95.25	94.5	95.25	94.75	95.1		
Dec. 1.	L. Tibials.	R. " A	95.25	96.	95.	95.75	95.5	95.25	95.75	94.75	95.75	95.5	95.4		
		B	90.5	90.75	90.5	89.75	90.	89.5	89.5	91.			90.1		
		A	91.	91.25	91.25	90.5	91.	89.75	90.5	91.75			90.3		
													Average,	92.1	33.4

large, the muscles of the calf being exceedingly well developed. (See Table on this page.)

Thus far the thigh muscles had not been brought into use, and although encroaching materially on that part of the head thought to cover sensory or non-excitable regions of the brain only, series of experiments on extension of the leg on the thigh (contraction of the quadriceps extensor femoris) developed the rather startling fact that activity of this large muscle caused a rise of temperature over a correspondingly large area of the posterior part of the head.

A careful compilation of eight experiments resulted in the laying out of an area occuying a position next the median line of the head, extending from the posterior boundary for the area of the calf 30 cm. behind the nose, very nearly to the occipital protuberance, 38 cm. behind the nose.

This area was on the average about 5 cm. broad, being wider at its anterior than its posterior extremity. Some rises in this area amount to as much as 2.75° F. The larger rises aggregated in the anterior extremity of the area, but rises of temperature worthy of note are seen as far back as the occipital protuberance.

Owing to the occurrence of many unsuccessful and misleading experiments, the search for a location of the flexors of the leg on the thigh was for a long time very unproductive. A careful compilation of nine experiments on this group of muscles warranted the setting aside of a pretty large area, external to the calf and in front of the quadriceps, of irregular shape, but about 5 cm. broad in both diameters. Some large elevations of temperature occurred here, the thigh flexors being large and strong muscles. The muscles are best brought out by attempting to flex the leg, the foot being fixed to the floor, the leg at right angles to the thigh. (See Table on p. 154.)

There are two sources of error in this experiment. There are almost always involuntary contractions of the leg muscles, either anterior tibials or calf, and always, it may be said, a marked antagonistic contraction of the psoas and iliacus muscles to be now described.

In flexing the thigh on the abdomen, contraction of the psoas and iliacus muscles, constant elevations of temperature are noticed over a small area, 3–4 cm. wide, lying in front of the quadriceps area, and abutting against the flexor area with the anterior extremity. Here it is that rises of temperature are often noticed in experiments on the flexors of the leg on the thigh, and which must be discarded.

It was thought that voluntary contraction of the muscles of the abdominal walls, so powerful in all expulsive efforts, might be in this region. The results of seven experiments with violent and prolonged retraction of the abdominal

Date.	Movement or Muscle.	Area of Head.													Average F.	Average C.
1880. Jan. 22.	R. Quad. extensor.	L. Oc-cipital.	B	89.75	91.25	90.75	91.5	91.75	90.75	92.	91.	90.5			91.	
			A	91.	91.75	91.5	92.	92.25	89.	91.25	90.5	89.75			91.	
" 24.	"	,,	B	92.25	93.	92.	92.5	93.	91.5	93.5	93.	91.			92.4	
			A	92.	92.25	92.	92.25	92.25	91.25	92.5	91.	90.5			92.	
" 27.	"	"	B	91.5	90.5	91.5	91.25	90.5	91.5	92.	93.5	93.			91.7	
			A	93.25	92.	92.5	92.75	91.5	91.5	92.	93.5	93.			92.4	
.. 30.	"	"	B	92.5	92.	92.	91.5	90.5	91.5	91.75	91.75	91.75			91.6	
			A	91.5	91.75	92.	91.5	91.5	91.5	91.75	91.75	90.75			91.6	
" 31.	"	"	B	91.25	93.25	92.25	92.		92.25	91.75	92.5	92.25	93.5		92.4	
			A	93.75	92.75	91.75	93.25	92.25	90.	92.	91.5	92.25			92.1	
Feb. 2.	"	"	B	91.5	92.25	91.	91.5	91.5	90.25	91.75	90.5	91.			91.2	
			A	91.	92.25	91.5	91.25	92.5	91.	92.	91.	92.75			91.7	
" 5.	"	"	B	91.75	92.75	92.75	92.25	92.5	94.	92.5	92.	93.25			92.6	
" 9.	"	2d subj.	A	93.25	93.75	93.25	92.75	93.	93.75	93.	93.	94.5			93.3	
		"	B	91.	92.	92.5	92.25	92.5	92.25	92.25	92.25	93.	93.		92.3	
			A	91.75	92.5	92.75	92.5	92.75	92.25	92.5	92.25	93.25	93.25		92.5	
Jan. 27.	Flexors leg on thigh.	"	B	92.25	93.5	92.75	93.	91.75	91.	91.75	90.5	90.75			91.9	
			A	92.5	93.	93.	93.	92.25	92.5	93.	93.	91.75			92.5	
" "		"	B	93.25	93.5	93.5	93.	92.25	92.75	93.25	93.75	92.5			91.9	
			A	92.	92.	91.75	92.5	90.5	94.	93.	92.75	92.75			91.7	
" "		"	B	93.5	93.	92.75	91.75	92.	92.25	93.	93.	91.75			92.5	
			A	92.	92.	92.	91.5	91.75	91.5	92.	92.75	91.75			92.	
" 28.		"	B	93.	94.	93.75	93.	92.25	93.	92.75	93.	92.			92.9	
			A	94.	93.5	94.	93.	92.	92.75	93.75	94.	92.5			93.2	
" 29.		"	B	92.5	92.75	92.25	92.75	92.5	92.	92.75	93.	92.			92.5	
			A	93.	92.5	92.25	92.	92.	92.	92.	91.5	91.			92.	
Feb. 1.		"	B	92.5	93.5	92.	92.	92.75	93.	92.25	88.75	92.75			92.1	
			A	91.	94.	92.75	92.	92.5	93.	92.75	91.25	93.5			92.6	
" 7.		"	B	94.	94.5	93.75	94.	94.	94.25	93.25	93.75	93.			93.8	
			A	93.25	92.75	93.5	93.	93.	93.	93.25	93.5	91.5			93.	
" 17.		"	B	94.25	94.5	94.5	93.25	93.5	93.25	93.25	92.75	93.			93.4	
			A	95.	94.5	94.25	94.	94.	95.	94.	93.75	93.75			94.1	
" 19.		"	B	93.	93.75	92.75	89.75	93.5	90.25	92.5	91.25	92.75			92.	
			A	92.	93.	93.	93.	93.	93.25	93.25	91.25	92.			92.6	
Jan. 31.	Psoas and iliacus.	Lateral occipit.	B	92.25	92.75	91.75	92.75	92.25	90.	92.	91.5	92.25			91.9	
			A	93.75	92.75	92.25	93.25	92.25	92.	92.25	92.	93.25			92.6	
Feb. 7.	"	"	B	92.5	91.	95.	94.25	94.	94.75	93.25	94.	94.			93.6	
			A	92.	93.	93.	93.	93.5	94.	92.	94.	93.5			93.1	
" 12.	"	"	B	92.	92.25	92.25	92.5	92.75	88.5	93.	91.5	92.75			91.9	
			A	92.5	3.	3.	3.	3.	90.25	92.	91.	92.75			92.5	
" 14.	"	"	B	95.	94.25	94.75	94.	93.75	94.75	94.25	93.5	93.25			94.1	
			A	94.75	95.	94.75	94.25	92.25	93.5	94.25	93.	93.5			94.1	
" 1.	Erector spinae.	"	B	93.75	93.	92.25	92.25	92.75	91.5	92.75	92.	93.25			92.6	
			A	93 75	94.	93.25	93.	93.5	89.75	94.25	93.	92.5			93.1	
" "		"	B	93.25	94.	93.25	93.	93.5	89.75	94.25	93.	92.5				
			A	93.75	94.	93.5	93.5	94.	91.	94.25	93.25	93.25			93.4	
" 7.	"	"	B	93.25	93.25	94.25	93.25	93.25	93.	92.75	93.5	93.			93.2	
			A	95.	95.25	94.75	93`25	94.5	95.25	94.25	94.25	93.5			94.4	
" 10.	"	"	B	93.5	92.	92.	92.	92.25	92.75	93.	92.75	92.25			92.6	
			A	92.75	92.5	92.5	92.25	92.	92.5	93.	91.75	91.5			92.3	
" 17.	"	"	B	95.	94.75	95.	94.	93.	94.5	93.5	92.75	93.5			94.	
			A	94.5	94.	94.25	92.75	92.25	94.25	93.5	93.	93.5			93.4	
														Average,	92.6	33.7

walls the movement thought best to secure good contraction of the abdominal muscles, without the diaphragm, when compiled, located a very definite area at the posterior part of the side of the head. The base of this area extended along a line drawn from about 1 cm. above the occipital protuberance to a point 1 cm. above the meatus

auditorius. The area itself, 3–4 cm. wide, extended from the anterior surface of the psoas and iliacus area forward to a point 2.5 cm. above and behind the ear, which is just above the mastoid process. The rises of temperature in this area were very large, and very constant in their situation.

Contraction of the erector spinæ group, which are in some sense the antagonists of the previous group, caused elevations of temperature in the area lying in front of the psoas and iliacus area, and between the area for the flexors of the leg on the thigh and the abdominal area just laid out. The means used to bring about contraction of this group was to have the subject sit on the edge of a chair, lean against its back, and then make extension on the lumbar spine, causing a condition of partial opisthotonos. This must be an extension of the spine on the pelvis only, otherwise the glutei or the thigh flexors will act.

Elevations of temperature in this region were seen in a few instances to follow contractions of the gluteal group, but there is doubt whether these were not due to contraction of the leg on the thigh, an almost invariable accompaniment in movements which call the glutei into action.

THE FACE.

The study of the effect of contraction of the facial muscles was one of the first undertaken. In these experiments the thermometers were grouped on the opposite side of the head and then unilateral facial movements, as winking and retraction and elevation of the angle of the mouth, were made with the result of finding that a constant elevation of temperature took place on the side opposite the movements. Occasional rises occurred, however, on the same side, and these were inexplicable until it was discovered that they were caused by contractions of the occi-

pito-frontalis and attollens aurem over which the thermome-
ters happened to be.   Muscular contraction being well
known to cause local elevation of temperature, this source
of error must be guarded against in all experiments on the
head and face.   After being satisfied that in these, as in
other, experiments a rise of temperature occurred only on
one side, all observations were restricted to the side of the
head opposite to the muscles involved.   An attempt was
made also to find areas for the different facial groups which
can be contracted singly.   To succeed in this the subject
must have considerable power over his facial expressions,
especially if unilateral movements are required.   In all ex-
periments unilateral movements are better, as activity of
the side on which the thermometers are placed, is very apt
to be misleading.

The first experiments were on the effect of retraction of
the angle of the mouth, (buccinator, risorius, etc.,) and wink-
ing with the eye of the same side (orbicularis palpebrarum).
These movements invariably produced a rise of temperature
on the opposite side of the head about 9 cm. above the ex-
ternal auditory meatus.   After a great many of these general
experiments were performed, attempts at analyzing the
facial area were made.   (See Tables on p. 158 and 159.)

Contraction of the platysma myoides, in the subject a
very powerful muscle and obedient to his will, produced
constant elevations of temperature in an area about 3 cm.
long and 2 cm. broad, and situated 7.5 cm. above and a little
behind the auditory meatus.   The rises of temperature seen
here ranged from .25° to 2.5° F., many large ones being
seen.

In a small area above the front part of this region, rises
of temperature were recorded after spasm of the orbicularis
oris, while farther back above the posterior part of the
platysma region, is a space which experimentation shows to

belong to the retractors of the angle of the mouth, (buccinator, etc.,) while higher, rises of temperature are seen, probably caused by the elevators of the angle of the mouth. Spasmodic contraction of the orbicularis palpebrarum alone (winking) caused a rise of temperature in a small district located above the buccinator area and slightly back of the same. Although not a very strong muscle pretty constant results were obtained, rises of over a degree F. being many times noted after its contraction. The fact of this being its location was rendered still more plausible by finding, pretty near by, the centre for ocular movements now to be described.

The movements made use of to locate the ocular area were general in their character, vertical, lateral, rotatory, accommodative, etc., etc.

As a result of these experiments, which sometimes produced intense weariness and vertigo in the subjects, quite a large region was marked out where subsequent elevations of temperature took place.

This area was situated in the lateral, posterior parietal region, about 8 cm. vertically distant from the point 24.5 cm. on the median line. This places it in the small space left between the flexors of the leg on the thigh, and the extensors of the hand and fingers on the forearm. It is also seen to be in close proximity to the area for the orbicularis palpebrarum. The knowledge of the location of this area may be of great use in studying the physiology of conjugate deviation of the eyes. Several experiments have been performed to that end with, as yet, no conclusive result. The investigation will be continued and the results published later. (See Table on p. 159.)

The area for the tongue has already been referred to. It lies above and in front of the orbicularis oris about 10 cm. from the meatus. It is contiguous to, if not identical

with the area for the hyoid group of muscles already described.

The only important group of muscles left are those of mastication, (masseters, pterygoids, temporals). These

Date.	Muscle.	Area.	Measurements.	Average F.	Average C.
Jan. 30.	Tongue.	Lateral B	89.75 89.25 90.5 91. 89.5 93.5 90.75 91.25 92.5	91.	
		Parietal A	90.25 89.5 91. 91.5 90. 93.75 91.25 91.75 92.75	91.3	
Feb. 1.	"	" B	92. 93. 93. 92.25 92.25 93.5 93.75 94. 93.75	93.1	
		A	93. 93.75 93. 93. 94. 94. 94. 94.25 93.75	93.6	
" 11.	"	" B	92.75 92. 91.75 91. 92. 93.25 92. 91.5 93.	92.1	
		A	93. 92.5 92. 92. 92.5 94. 92.25 92. 93.5	92.7	
" 14.	"	" B	94.5 94. 94.5 92. 93. 95. 93. 94. 95.	94.1	
		A	94.75 94.5 94.5 92.5 93. 95.25 95.25 94.25 95.25	94.2	
" 17.	"	" B	94.25 93.75 93.75 93.75 93. 93. 93.25 95.25 93.25	93.4	
		A	94.75 94.25 94. 93.75 93.5 93.5 93.25 94. 93.5	93.8	
" 19.	"	" B	93. 94. 93.75 94. 94.5 94.25 94. 94.5 95.25	94.1	
		A	93.75 94.5 94. 94.25 95. 94.5 94.25 94.75 95.5	94.5	
" 22.	"	" B	91.5 90.25 93.25 91. 93. 91.75 92.5 93. 93.	92.1	
		A	92. 91. 93.25 91.25 94.5 92.5 93. 93.5 93.	92.8	
Jan. 29.	Hyoids.	" B	92. 92. 93.25 92. 91.5 91. 93. 93.5 93.	92.3	
		A	93. 92.75 93.75 92.25 91.25 91.75 94. 93.75 93.25	92.8	
Feb. 14.	"	" B	93. 92.5 93.5 90. 92. 94. 92. 93. 94.5	92.7	
		A	94.5 94. 94.5 92. 93. 95. 93. 94. 95.	93.9	
" 1.	Artic. m'v'm'ts	" B	93. 93.75 93. 93. 94. 94. 94. 94.25 93.75	93.6	
		A	93.25 93.75 93. 93. 94. 94. 94. 94.5 93.75	93.7	
" 12.	Masseters Orbic.	" B	95. 95.25 95. 93.75 93.75 94.5 95. 95. 94.5	94.5	
		A	95.5 95.75 95.5 94. 94. 95.5 95.5 95.5 95.	95.1	
Jan. 24.	palp.	" B	92. 92.5 92.5 92.25 93.25 91.25 91.25 91.25 91.25	91.9	
		A	92.5 93. 93. 92.75 93.5 91.25 91.75 91.25 91.25	92.	
Feb. 1.	"	" B	92. 90.5 90.25 91. 93. 93. 93. 92.75 94.5	92.3	
		A	93. 92. 91. 92. 93.75 93.5 93.25 93. 94.75	93.	
" 3.	"	" B	86. 84. 87.5 85.5 85.5 86. 86. 83. 83.	85.1	
		A	86.5 85. 87.75 85. 88.5 86. 86.5 83.25 84.5	85.9	
" 5.	"	" B	91.5 91.75 93.5 92. 93. 92.25 92.5 91. 92.	92.1	
		A	92. 92.25 94. 92.75 93.75 92.75 93. 92. 92.75	93.	
Jan. 1.	Face.	" B	92. 90.25 90.25 88.5 89.75 89. 91. 92.75 89.	90.7	
		A	93. 92. 91.75 88.5 90.25 92. 91.5 92.5 91.5	91.5	
" 4.	"	" B	93.75 92.5 91.5 90.25 90.5 90.5 91.75 91.5 91.	90.5	91.5
		A	94.5 94.5 93.5 94. 94. 93. 91.5 91. 92.	91.5	92.9
" 9.	"	" B	92.25 92.75 93. 93.25 93.5 92.75 92.5 92.25 92.	93.5	92.8
		A	92.5 92.75 92.5 92.5 93.25 92. 92.25 92. 92.5	93.25	92.5
" 12.	"	" B	95.5 95.75 95.5 94.75 95.25 95.25 95.25 95.25 95.5	95.25	95.3
		A	95.5 95.75 95.5 94.75 95.25 95.25 95.25 95.25 95.5	96.	95.3
" "	"	" B	94.25 94.75 95. 94. 94. 94.5 94.75 94.25 94.5	95.	94.7
		A	94.5 94.75 95. 94.5 94.5 94.5 94.75 94.75 94.5	95.	94.7
" 13.	"	" B	91.25 91.75 92.5 91. 92. 92.5 91.25 92.5 91.5	92.	92.
		A	90. 91.5 92.25 90. 92.25 92.75 90.75 91.75 92.	92.25	91.6
" 14.	"	" B	92.25 91.75 90.5 91.75 93.25 92.5 91.5 92.75 91.75 91.25		92.
		A	92.25 91.75 91.5 91.5 93.75 93.25 91.5 93.25 91.75 91.25		92.6
" 4.	"	" B	94.75 93.5 93.75 93.25 93.25 92.5 92.75 93.5 93.	93.	93.8
		A	93.75 93.75 94. 93. 92.25 93. 93.5 94. 93.	93.75	93.7
" 29.	"	" B	91. 92. 92.5 91.75 90.5 92.5 91.25 92.75 89.75		91.5
		A	92. 92. 92.5 92.25 90.5 92.5 92.75 92.75 89.75		92.
" 30.	"	" B	89. 88.5 89.75 90.25 89. 93. 90. 90.5 92.25		90.2
		A	89.75 89.25 90.5 91. 89.5 93.5 90.75 91.25 92.5		90.7
Dec. 1879.	Face.	Negro. B	92.75 94. 94.5 93.5 91.75 94.25 93.25 92.75 94.25 93.5		93.8
		A	93.25 94.25 94.5 93.75 92.5 94.25 93.5 92.75 94.5 94.25		94.1
"	"	" B	92.75 94.25 94.25 93.5 93.25 94.5 91.75 92.75 93.5 94.		93.8
		A	92.75 94.5 94.25 94.25 93.5 94.5 92.5 93.25 95.75 94.25		93.8
"	Miscel- laneous.	" B	93.25 94. 94.5 93.25 94.5 93.75 93.75 95. 94.25 94.5		94.5
		A	92. 93.5 93.25 92.5 93.75 93.25 93.25 94.25 93.25 93.75		93.5
"	"	"	92. 93.75 93.25 94. 92.75 93.5 93.25 93.5 93.5 93.75		93.7
			92.75 93.25 93. 93. 94.5 93.75 92. 93.5 94.75 94.		93.8
"	"	"	93.25 93.25 91.75 93.25 93.25 94.5 93.		93.1
			92.75 94. 94.25 93.5 93.75 94. 93.75 94.		93.8

Average, 92.8 | 93.3

being exceedingly strong muscles, one would think it very easy to locate them, but the reverse is the case. Two causes prevent their easy localization ; one is the fact that they cannot be contracted unilaterally, and the second is that their areas are in all likelihood situated directly underneath the very muscles, (temporals), which when active themselves, develop a large amount of heat. Temperatures taken

DATE.	MUSCLE.	AREA.											Average F.	Average C.
Jan. 22, 1880.	Retraction of angle of mouth.	Lateral parietal	B	89.75	92.	91.5	89.5	91.	89.5	89.25	88.5	89.5	90.	
			A	91.	92.	90.75	91.	90.25	90.75	90.5	88.5	89.25	90.04	
Jan. 27.		"	B	93.5	93.25	93.5	92.5	92.	91.5	92.25	92.25	92.	92.5	
			A	93.75	93.75	93.75	92.5	92.	91.75	92.5	92.75	91.75	92.7	
Feb. 1.	"	"	B	93.	92.	91.	92.	93.75	93.5	93.25	93.	94.75	92.7	
			A	93.	92.	91.	92.	93.75	93.75	93.5	93.	94.75	92.9	
" 4.	"	"	B	92.	93.	93.5	93.	92.	94.5	92.	93.5		92.8	
			A	92.25	93.25	94.	93.25	92.	95.	92.5	92.5	93.5	93.	
" 10.	"	"	B	92.75	91.75	91.25	89.	92.25	94.	92.75	93.	92.5	92.1	
			A	93.	91.75	91.25	89.	92.25	94.	92.75	93.	92.5	92.	
" 19.	"	"	B	92.25	91.5	92.	93.	94.5	93.5	93.75	94.	94.25	93.1	
			A	92.5	92.25	92.5	93.25	94.75	93.75	93.75	94.	94.25	93.4	
" "	"	"	B	92.5	92.25	92.5	93.25	94.75	93.75	93.75	94.	94.25		
			A	93.	92.25	92.5	93.5	95.	94.	93.75	94.	94.5	93.6	
Jan. 1.	Orbic. oris.	"	B	92.	93.25	92.5	93.	93.	92.75	91.5	91.	92.25	92.3	
			A	92.	93.5	93.	93.	93.	93.5	92.	91.25	92.5	92.6	
" "	Platysma Buccin.	"	B	92.	93.5	93.	93.	93.	93.5	92.	91.25	92.5		
			A	94.	93.5	93.25	93.	93.	93.5	92.5	91.5	92.75	92.7	
" 22.	Platys.	"	B	92.	91.5	89.5	91.	89.5	89.25	88.5	89.5		90.	
			A	89.	91.25	90.25	90.	91.5	91.5	87.5	88.25	90.25	89.	
" 24.	"	"	B	91.	92.	92.25	91.	91.25	90.5	91.	91.	90.5	91.1	
			A	92.	92.5	92.50	92.25	93.25	91.25	91.5	91.25	91.25	91.9	
" 27.	"	"	B	93.	92.75	93.	92.	91.25	91.5	92.	92.	92.	92.1	
			A	93.5	93.25	93.5	92.5	92.	91.5	92.25	92.25	92.	92.5	
" 29.	"	"	B	92.	92.25	91.75	92.25	90.75	91.	92.	91.75	92.5	91.5	
			A	92.75	92.	92.5	92.5	91.5	93.5	92.	92.75	91.5	92.3	
" 30.	"	"	B	92.	92.	92.	92.	90.5	92.75	92.	91.25	93.5	92.	
			A	92.5	92.5	92.75	92.5	91.	93.	92.	91.75	93.5	92.2	
Feb. 10.	"	"	B	93.	91.75	91.25	89.	92.25	94.	92.75	93.	92.5	92.1	
			A	93.	92.	91.5	89.25	92.5	94.	92.75	93.25	92.5	92.3	
" 16.	"	"	B	93.	92.5	92.	92.	92.5	94.	92.25	92.	93.5	92.6	
			A	93.	92.5	92.5	92.	92.5	95.	92.25	92.	93.5	92.8	
" 1.	Occip. Front. Eyes.	"	B	93.	92.	91.	92.	93.75	93.75	93.5	93.	94.75	92.7	
			A	93.	92.	91.	92.	93.75	93.75	93.75	93.75	95.	93.	
Jan. 1.	"	Poster'r parietal	B	89.5	88.5	89.	90.	89.5	90.25	89.5	89.	90.	89.5	
			A	90.75	89.	90.	90.5	89.75	91.	90.5	91.75	91.25	90.5	
" "	"	"	B	81.75	88.75	90.	87.75	89.	87.	87.5	88.5		88.5	
			A	81.75	88.	88.75	85.75	88.5	87.	89.			88.	
" 2.	"	"	B	90.5	91.	92.75	92.5	91.25	89.5	90.5	90.	91.	91.75	91.
			A	91.75	91.	91.5	92.	90.5	91.25	90.5	90.75	91.25	89.75	91.1
" "	"	"	B	91.	91.5	92.25	91.75	92.25	92.	92.	91.75	91.	91.7	
			A	91.75	92.75	92.25	91.5	92.	92.25	92.	92.5	91.75	91.5	92.2
" 3.	"	"	B	88.5	92.	91.	92.75	92.	88.5	90.75	90.5	86.25	91.75	90.4
			A	86.5	92.5	91.	92.	91.75	90.	90.75	90.5	84.5	91.25	90.
" 31.	"	"	B	90.75	88.25	88.5	90.5	88.75	88.75	90.5	89.	91.	89.4	
			A	90.	89.75	88.75	90.5	90.25	88.75	90.25	88.5	90.5	89.7	
Feb. 3.	"	"	B	92.	91.75	91.75	93.	91.	92.	92.75	92.	92.25	92.	
			A	92.25	93.75	93.	93.5	92.	93.5	93.5	92.75	92.25	92.9	
" 17.	"	"	B	93.5	94.25	94.25	94.	93.25	93.75	92.5	93.5	94.5	93.7	
			A	93.25	94.	94.5	93.75	94.5	93.75	93.25	93.5	94.5	93.9	
												Average,	92.8	33.8

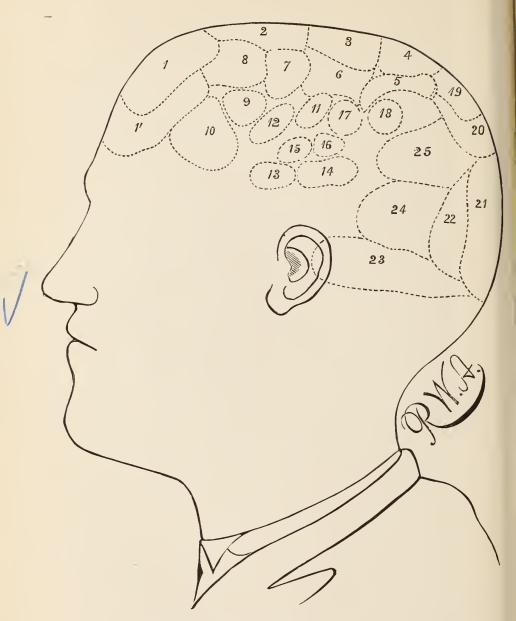Averages of all Temperatures taken, about 3,000 in number. . . . 92.4 33.6

Fig. 5.—Outline of the head of the first white subject, with all areas mapped
out.   Explanation on p. 161.

FIG. 5.—1. Trapezius and levator anguli scapulæ, probably middle part of the trapezius and rhomboids, (elevation, retraction and depression of shoulder).

2. Deltoid, (abduction of the arm).

3. Biceps, (flexion and supination of the forearm, hence probably near or in this space belongs the area for the brachialis anticus).

4. The triceps, (extension of the forearm).

5. Extension of the hand and fingers, also interosseii.

6. Flexors of the hand and fingers, (also probably between this area and and 3, a space for the supinator longus).

7. Latissimus dorsi, (depression and retraction of the shoulder aside from the trapezius.)

8. Pectoralis major and perhaps part of serratus magnus, (adduction of arm and depression—forward—of the shoulder).

9. Complexus, trachelo-mastoid and other deep extensors of the head and neck.

10. Scaleni, recti antici, etc , (bending the neck forward).

11. Elevation of the angle of the mouth.

12. Tongue, and hyoid group.

13. Sterno-mastoid.

14. Platysma myoides.

15. Orbicularis oris.

16. Buccinator, etc., (retraction of the angle of the mouth).

17. Orbicularis palpebrum.

18. Ocular muscles, recti and oblique.

19. Anterior tibial group, (flexion of foot, on the leg, and extension of the toes).

20. Calf group of muscles, (extension of foot, on the leg and flexion of the toes).

21. Quadriceps extensor femoris, rectus and vasti, (extension of the leg on the thigh).

22. Psoas and iliacus, (flexion of the thigh on the abdomen).

23. Abdominal muscles, (retraction of the abdominal walls).

24. Erector spinæ, etc., (partial opisthotonos).

25. Biceps, semi-membranosus and semi-tendinosus, (flexion of the leg on the thigh).

in this region and elsewhere show marked variations, but the fact that a thermometer, placed on the opposite masseter muscle during the experiment, showed a rise of 2.76° F. rendered these results uncertain. The region, which will undoubtedly be located soon, is very probably in the lateral parietal region, about 6.5–7.5 cm. above and in front of the meatus.

Thus far it will be observed our efforts have been directed solely to the mapping out of circumscribed areas on the scalp in which constant elevations of temperature occur after willed activity of certain muscles or groups of muscles. No mention has been made of the relations these areas bear to the subjacent convolutions. The latter will be the subject of the next chapter, while this will close

with a brief summary of the results of the foregoing experiments, the accompanying figure showing the muscle areas as marked out on the graduated head. (See p. 160-161.)

CORROBORATIVE EXPERIMENTS ON OTHER SUBJECTS.

For reasons given before it was thought best to confine almost all experiments to one subject, and, after it was proven that the rises of temperature following unilateral movements were unilateral, to confine observations to the opposite side of the head.

Most of the temperatures, from which the foregoing conclusions were reached, were hence taken on the left side of one subject's head. Corroborative experiments were made on the opposite side of his head, and on the head of a second white subject, and a negro, both adult males.

The muscles experimented on in the white subject, were the right triceps and quadriceps femoris.

FIG. 6.—Outline of the head of the second white subject with areas of his triceps, (4), and quadriceps, (21).

On account of the thickness of the hair in the subject, the rises of temperature were not large, but still they were marked and located as in areas 4 and 21, Fig. 5.

Their location is shown in the appended figure.

The negro, selected on account of his well-shaped head and close-cut hair, proved almost useless as a subject because, although intelligent, it was hard to teach him to contract but one muscle at a time, and he could not be left quiet but a few minutes at a time without going to sleep.

This latter habit, which may have been the prodromic stage of the sleeping sickness of his fatherland, although annoying, beautifully demonstrated one fact, however, and that was that with the outset of sleep there was a general
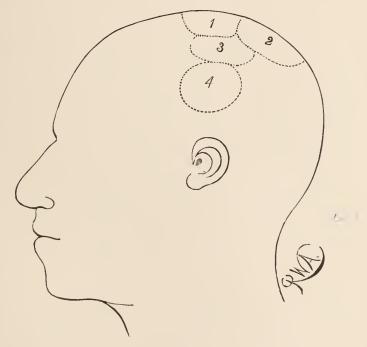
FIG. 7.—Outline of negro's head with areas: 1, face; 2, leg; 3, arm; 4, forearm.

fall of his cranial temperature of about a degree Fahrenheit. This was demonstrated on several occasions.

The muscles experimented on in the negro were the facial, arm, forearm, and leg groups. These experiments were on different sides of the head, but for simplicity they are all shown in the following outline of the left side of the head. The areas as marked out, corresponded very nearly to areas for the arm, forearm, face and leg in figure 5.

The movements used to attain these results were the same as in the former experiments.

THE APPLICATION OF THE RESULTS OF THE FOREGOING EXPERIMENTS TO THE STUDY OF CEREBRAL LOCALIZATION.

Had it been possible, at the end of these experiments, to have killed the subject, and to have compared the external areas with the subjacent convolutions, as they who experiment on dogs and monkeys can do, the task would have been easy, and the result definite. This being impossible, however, it will be necessary to call in the aid of craniocerebral topography, so ably worked out by others, and by it look through the cerebral envelopes at the cortex itself. This will be done as follows : First, in a full-sized outline of the head insert an outline of a properly fitting skull, with its sutures (the location of which can be made out on most living heads); then inside the skull outline the convolutions and fissures of a normal brain, and over all trace in broken lines the muscle areas as marked out on the surface of the head.

Such is the construction of the adjoined plate. In order to preserve clearness of outline, all attempts to represent the perspective of the head, as lines, shading, etc., have been omitted, and unless the distance between the superficial areas and the cortex is carefully reckoned, the plate will be apt to mislead. To explain more fully : the super-

ficial areas are distant 1.–1.5 cm. from the cortex, being separated by hair, scalp, skull, dura mater and inter-meningeal space. This distance may be neglected when looking at those parts of the head lying at right angles to the line of vision. When the areas near the periphery are looked at, however, this separation of the two planes makes the superficial area seem farther from the eye than the corresponding area of the cortex.
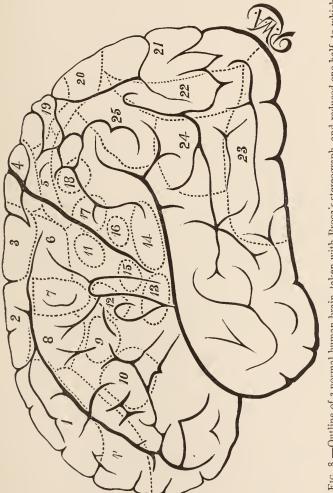
FIG. 8.—Outline of a normal human brain, taken with Broca's stereograph, and reduced one-half, to which the external motive areas have been transferred (numbers the same as in Fig. 5.)

This discrepancy increases as the periphery is approached, and some of the areas near the median line seem wholly beyond the brain substance. To project them properly on the cortex, one must study the position they would assume if dropped perpendicularly on the subjacent convolutions.

This has been carefully done in Fig. 8, appended.

The part of the brain underlying the trapezius area is thus seen to be the anterior part of the first frontal convolution. Further back on the same comes the deltoid, and further still the biceps area, while that of the triceps probably overlaps to a slight degree the fissure of Rolando. The area for the scaleni, etc., will fall on the second frontal convolution, in front of its middle; the deep extensors of the neck on the second frontal convolution near its middle. The pectoralis area will fall on the middle of the second frontal convolution, slightly overlapping the superior frontal sulcus. The area for the latissimus dorsi occupies a similar position farther back.

The point of junction of the superior and ascending frontal is occupied by the hand and finger flexors, while lower on the ascending frontal lies the area for the elevators of the angle of the mouth, and lower still the orbicularis oris in front of and above which is the area for the tongue and hyoids, which lies on the third frontal convolution. At the base of the ascending parietal convolution, but reaching a slight distance across the fissure of the Rolando, lies the platysma area, higher the area for the orbicularis palpebrarum, and higher still, lying partly on the ascending parietal, and partly on the ascending frontal convolutions, is the area for the extensors of the hand and fingers.

The anterior part of the superior parietal lobule holds the anterior tibial area, behind which lies that of the calf.

On the posterior part of the superior parietal lobule, but falling chiefly on the first and second occipital gyri is found

the area for the quadriceps extensor femoris, while on the third occipital gyrus and the posterior part of the inferior middle temporal lobule will fall the area for the abdominal muscles. On the posterior parts of the angular gyrus and middle temporal lobule will fall the psoas and iliacus area. The rather indefinite area marked out for the erector spinæ overlies about equally the posterior part of the upper and middle temporal lobules, while higher up over the contiguous portions of the angular and supra-marginal gyri, and the superior temporal lobule is the area for the flexors of the leg on the thigh. On the upper part of the supra-marginal gyrus will fall the area set apart for ocular movements.

This transference of the motor areas from the scalp to the brain leaves but little of the cerebral convexity uncovered, viz., the anterior half of the temporo-sphenoidal lobe and the extreme anterior frontal region.

SIGNIFICANCE OF THE EXTERNAL MOTOR AREAS.

The question now arises, what these areas, as marked out on the surface of the head, are. What can they be but the outward representation of psycho-motor centres in the cerebral cortex? To revert to the propositions laid down at the outset. All will agree, first, that the psycho-motor centres, for some groups of muscles, are located in a certain definite part of the cortex, and, second, that changes of temperature in the cerebral cortex, when marked, are indicated by surface thermometers. If, after willed activity, then, of a certain muscle, a rise of temperature occurs in a small area of the scalp, which is known to directly overlie the cortical centre for that muscle, and nowhere else, it is natural to attribute the rise of temperature on the scalp to a larger rise of temperature in the subjacent motor centre. If, now, with contraction of a different muscle, there occurs

a rise of temperature in an equally definate area in some re-
mote part of the head, what is more natural to think that
this too is caused by the functional activity of a subjacent
psycho-motor centre, even if its location does not harmon-
ize with the accepted theories on the subject?

The question naturally arises, were not some of the large
elevations of temperature noticed by Lombard in his ex-
periments on the effect of mental states, and by Gray in his
lecture, due largely to muscular action? Some of the large
rises in Gray's cases were situated over the facial and arm
centres, which must necessarily be active during a spirited
lecture, especially if the lecturer gesticulate much.

A further proof of this theory is the striking similarity
between the centres marked out by thermometry and those
of Ferrier (compare Figs. 2 and 5).

This similarity is particularly marked in the leg, arm, fore-
arm and facial centres in both diagrams.

Compare, for instance, the functions he attributes to his
single area, 2, 3, 4, and the functions given to the areas, 3,
4, 19 and 20 in Fig. 5. Ferrier's circles, a, b, c and d oc-
cupy much the same locality as centres 5 and 6 in Fig. 6.
His 7 and 8 correspond pretty well to 11 and 16 of Fig.
8. His 9 and 10 to the 12 and 15 of Fig. 8. His 11 is al-
most exactly covered by 14, Fig. 8. His circle 12 would
include, among others, the centre 9, Fig. 8. His centre 5
corresponds pretty well to area 2, Fig. 8, while his 1 would
cover a part of the areas 19, 20 and 21 in Fig. 8. His cir-
cles 13, 13[1] fall somewhat below the area 18, Fig. 8.

A careful comparison of the functions attributed to the
corresponding parts in the two figures is particularly inter-
esting.

It will be seen, however, that centres are more closely
analyzed in Fig. 8 than in Ferrier's chart. It will also be
seen that a great many centres are added to his list in Fig.

8, and regions of the brain hitherto considered psychical or sensory have been peopled with psycho-motor centres. This fact, it is known, will receive some severe criticism, and it will be asked how can the centre for the trapezius, for instance, be located on the frontal lobes, destruction of which has been known to cause no paralysis ? The answer to this question is two-fold : In the first place, look to Ferrier again. The point at which he locates the centre for the " extension forward of the arm and hand, as in putting forth the hand to touch something in front," corresponds to the area 2 and part of 8 in Fig. 8, which are allotted there, to the deltoid and pectoralis major, the two muscles which, *par excellence*, are involved in this movement. Again, his large area 12, " a centre for lateral movements of the head and eyes," lies largely on the middle of the first frontal convolution, where in Fig. 8 lies the trapezius, a very strong muscle in head movements.

In the second place, when a case is forthcoming in which the absence of *all* paralysis can be proven, then it will be time to retract.

When the surgeon stands at the bedside of a patient who has received a destructive wound of the frontal lobes, or when a physician examines a semi-comatose subject, suspected of having a cortical lesion in the same location, what is done ? The patient is asked to move his hand and fingers, which he does, his forearm, which he flexes and extends, and perhaps (although rarely) he may be asked to abduct the arm, which also is possible. As an extra refinement, a dynamometer may be thrust into his hand, and he may squeeze 20–40 kilogrammes.

Death ensues, an autopsy is made, and the case is published as one of destructive lesion of the frontal lobes without paralysis.

Might not a closer examination have revealed the fact

that the power of shrugging or retracting the shoulder was lost or weak (trapezius), or that the power of extending the arm and shoulder forwards was diminished (pectoralis major), although perhaps the arm could still be abducted (deltoid), or still, again, some impairment in head movements (trapezius, rotators, extensors, scaleni, etc., etc.)?

When these symptoms are looked for and not found, and destruction of the areas 1, 8, 9 or 11, Fig. 8, are demonstrated, then will be the time to reconsider the statements in the preceding pages.

Destruction of cerebral substance, especially traumatic, is so often accompanied by mental obscuration or coma as to make a strictly scientific examination very difficult.

Again it will be said, how explain those cases of complete hemiplegia where only a small lesion, seemingly involving only one of the small areas laid down in Fig. 8 exists?

The reply is a question.   Is the anatomy and physiology of the centrum ovale sufficiently well known to trace exactly all commissural and radiating fibres to their cortical terminations, or to show what effect a superficial cortical lesion has on the subjacent white matter?

If such is not the case, may not, perhaps, some fibres of the corona radiata originating in the occipital lobes join the motor tract, or may not a small cortical centre, which is the seat of a lesion, by its commissural connections, be able to arrest the functions of its fellows?

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UNIFORMITY IN GRAPHIC RECORDS.

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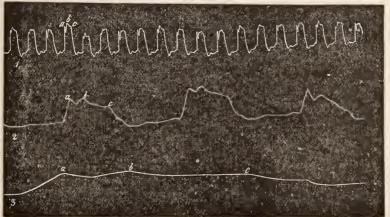
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THE graphic method, whose application now extends from experimental physiology to physic, will not have acquired its full value until an agreement is entered into between those who use it, in regard to the measures, times, and rules of its *modus operandi*.

First we must adopt a direction in the reading of the tracings. This direction must be the same as that of ordinary writing from left to right. But too many authors have adopted the Oriental reading from right to left, without the slightest physiological reason for thus upsetting our visual and mental habits : only to suit the form of their instruments. as if the mind was made for the instrument, instead of the instrument to suit the mind. For the eye it is worse, since notwithstanding the warning which may have been given to the contrary, it is to the memory of visual impressions that the tracings of the physiological phenomena speak first, therefore by it are registered as images. In proof of which, if two similar tracings are presented to the eye in contrary orientation the two images inverted in regard to each other will never permit the mind to form a like ideal of the two. It is easy to see the gravity of the situation caused by a craving for discrepancy (called originality) in this matter, by causing two copies of the same sphygmographic

tracing to be put one above the other; and as we read it from left to right, the other as they read it, from right to left, you will see how difficult it is, even for the most experienced eye to make out the points of comparison between the two.

Allow me here in parenthesis to give an advice whose necessity comes to me under the shape of sad experience. Printers will often invert the stereotypes of tracings. We often meet in books with this unconscious blunder, particularly in pulse-tracing, which are thus rendered unintelligible. I would propose in order to render this mistake impossible, to affix a letter or conventional mark, indicating the upright position which the stereotype must occupy in the page.

But the most important reform would be the making of an agreement in regard to the uniform scale of the time of a graphic operation. In other terms, I consider it an urgent reform to inscribe the tracing upon a paper which shall move at a uniform rate of speed. Indeed, the tracing of a given act taken on a paper running at a certain speed of the chariot will differ entirely from those taken at different speeds, as shown by the following example:

These three tracings are of the the pulsations of the heart of a subject, taken with the same apparatus, but when the paper was on chariots running at different speeds. That is why the undulations A, B, C, though common to the three tracings, give lines which differ so much as to have lost the characters of their identity, showing that a uniformity in the march of the chariot, is the condition of fidelity in the results.

If it is necessary to take the tracings at a uniform speed it is equally necessary to agree upon what that speed shall be, and to use that speed agreed upon, in order to insure the uniformity of significance as well as the truthfulness of the tracings. In the stereotype here represented, figure 2 is the only one which reproduces truthfully the details of the curves: figure 1 condenses them too much : and figure 3 makes them too flat by extension.

The tracing No. 2 is obtained with a speed of the paper corresponding to 0.02 m. (two centimetres) per second. This is the most favorable metric value or time for calculation, because it allows us to measure mathematically the fractions of a second, since one-tenth of a second would correspond to a length of 0.002 m. (2 millimetres).

But if this speed of the paper is the most convenient for certain experiments, as those on the circulation of the blood, on the respiration, and on the muscular contractions ; there are others, in which the paper must travel on swifter or slower chariots. Thus, for the tracing of phenomena of long duration, the speed must sometimes be as slow as 0.001 m. (1 millimetre) to the minute ; whilst for the tracing of rapid acts, for instance of the nervous acts of vision by the method of Helmholtz, or by that of Du Bois-Reymond, the second needs to correspond to a speed of 1 m. (1 metre) of the paper.

I have discussed in my *Méthode Graphique*, page 461, etc.

the general reasons which must guide us in the choice of sphymographic times, and I proposed five rates of speed, as sufficient for almost all wants. Now, upon a larger experience, and for the sake of simplicity and uniformity, I propose to reduce the number of rates of speed to be employed in physiological experiments to the three above mentioned. For the usual experiments made upon man in health or in disease,—such as those to obtain the graphics of the pulse, of the movements of the heart, of the changes of volume of organs by respiration, muscular contraction, etc.,—I think a unique speed of the chariot carrying the paper would suffice, and that the best would be that of 0.02 m. (or 2 centimetres) per second, which is easy to obtain with precision.

I submit these suggestions to physiologists and physicians with a degree of earnestness, since the more we work without uniformity of measure of time, the more we prepare elements of chaos instead of elements of science. Therefore I call attention to the necessity of agreeing on a measure of sphygmographic time, and would be happy if this appeal leads us to the adoption of uniformity in our tracings.

THE HYSTERICAL ELEMENT IN ORTHOPÆDIC SURGERY.*

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I HAVE seen a large number of cases of simulated dis-
eases of the spine, from the histories of which I select
the following as affording the most instruction.

CASE 9.—Miss ——, aged 14 years, residence, New York State,
was seen in consultation September 28, 1879.

The history shows that the patient has always been a strong
child. She is one of six children, three of whom are now living,
one having died in early infancy, one of diphtheria, and a third
of convulsions following measles. Two of the survivors have had
convulsions. The patient has had rheumatic pains at various
times in shoulders, hips and knees, which were, however, of but a
few hours' duration.

The hereditary history shows phthisis on mother's side, one
case of Pott's disease in a very remote branch of the family, and
on the father's side, gout.

There was no trouble with the patient's back until five years
ago, about which time, riding down hill in a little wagon, she fell
therefrom, striking the lower part of her spine upon a stone. She
was able to walk, however, and went to her room. A "black and
blue" spot appeared at about the last lumbar vertebra; she was
rubbed with liniments, kept quiet for a few days, recovered per-
fectly and remained entirely well for three years. Two years
ago, when about twelve years of age, she began to ride on horse-

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* Read before the New York Neurological Society, Dec. 1, 1879.

back, and became particularly active and venturesome. One day
after a long ride she complained of her back, and the family phy-
sician was summoned. He thought "the muscles were strained."
Iodine was applied, and rest prescribed in the recumbent position
for a few days. Again recovery was complete, and the young girl
was as active as before, except that the horseback rides were dis-
continued for about three months, when her father bought for her
use a Shetland pony. He "bolted" one day and threw the girl
over his head, again injuring the spine, which was treated as be-
fore with iodine and rest. But on this occasion other symptoms
supervened. Practice at the piano tired her : "her back would
ache between the shoulders." Practice was dropped. She be-
came nervous and irritable ; was very tired after slight exertion ;
desired to support her head when sitting down, and the spine
became tender at various points. In this state of affairs the
mother's attention was called to a case of Pott's disease in a dis-
tant relative. She became very anxious about her daughter, who
became very anxious about herself. The tender spots along the
spine became more tender, the spinal ache was more marked.
The family physician admitted he was in doubt as to the condition
of the spine, and the case was sent to a prominent surgeon of this
city for advice. A diagnosis of Pott's disease at the last lumbar
vertebra was made ; the patient was placed on her back for three
weeks, leeches and ice were applied to the spine, and she was
then encased in a plaster jacket, after suspension, the operation
being repeated five or six times in fifteen months, each time with
relief. After the removal of the last jacket, however, the symp-
toms became worse, and the patient, naturally enough, objected
to its renewal during the Summer. Her mother, in the meantime,
had kept the patient very quiet, waiting for the cooler weather.
When the patient applied to me for advice, the mother remarked
that her daughter's symptoms were worse than ever before, and a
fear existed that a relapse had occurred.

Examination.—Several hyperæsthetic spots over the spine,
chiefly in the region of the 12th dorsal and 1st lumbar vertebræ ;
the pain, however, when present, was lower down, near the sacrum,
and it had always been of a superficial character, the friction of
her underclothing at the tender points hurting her more than the
surgeon did by pressure when examining the parts. There was
no pain or history of pain in the abdomen, thighs or pelvis.
Careful examination showed normal flexibility of the spine in all
directions, and there was no muscular resistance when the psoas

and iliacus were put upon the stretch, with patient in the prone position and pelvis firmly held.

The spinal deformity showed itself principally in a marked excurvation, a slight drooping of the right shoulder and some lateral deviation. Lower extremities of equal length. All traces of deformity disappeared in the prone position.

Patient very evidently an emotional girl of active mind and of tolerably full habit. There is no evidence about her—in gait, attitude, or expression—indicative of Pott's disease.

A diagnosis of neuromimesis was made, and the patient was told, much to her surprise, that no apparatus was required. She was instructed to resume her equestrian exercise, and to do, in short, the same as other girls of her age in such matters. A letter recently received states that my diagnosis has been fully confirmed.

It seems scarcely necessary to comment on this case, and I would not make extended comment had not the error in diagnosis been committed by one whose opinion in such matters is generally accepted as authoritative.

1st. It has been stated again and again by various writers that superficial tenderness over the vertebræ is indicative of disease of the spine—a statement which other writers contradict.* The truth is that this localized tenderness does exist in many cases of true vertebral caries, but

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* For example : C. B. Radcliffe, M.D., F. R. C. P., in Reynold's System of Medicine (vol. ii, p. 718, Article, " Caries of the Vertebral Column,") describes among other symptoms of this disease " a feeling of undue heat, or even burning in the weak and painful and prominent part, which is not felt in other parts of the spine, when a sponge soaked in moderately hot water is passed down the spine—a state of tenderness on pressure or concussion, which is equally restricted to the same weak and painful and prominent part." On the other hand, Skey, in the valuable work already quoted, (p. 56), deals thus forcibly with these symptoms : " Of all the fallacies that cling to professional practice, of all the false doctrines which the pardonable ignorance of a former generation has entailed on modern surgery, none can surpass that which affects to detect a carious disease of the body of a vertebra by drawing the fingers down the spine." Again, p. 55, he says : " Fifty or sixty years ago, a provincial surgeon of some note recommended the application of a hot sponge to the spine with a view to detect disease of the bodies of the vertebræ—there was some excuse for ignorance then—there is none now." My own experience leads me to wish that Skey's statements might find a place in every work on surgery. The frequency with which one hears the remark " There is tenderness over the vertebræ," proves that faith in this symptom as diagnostic of vertebral caries is still widespread. In true disease it has no significance whatever as a symptom of actual disease of the bone.

it is frequently developed by the surgeon at his examination, and has no real connection with the lesion. There is this difference between the tenderness of the sub-cutaneous tissues in Pott's disease and the hyperæsthesia of neuromimesis. In the former it is rarely made the subject of complaint by the patient, and, as before stated, is often developed by the surgeon at his examination—while in the latter condition it is one of the very first of which the patient speaks. The neuromimetic fastens on any abnormal sign—often of the most trivial character and exaggerates its importance ; the victim of Pott's disease has enough to engage his attention without searching for superficial tender spots.

2d. It may be safely asserted that perfectly normal movements of the spine are incompatible with the existence of Pott's disease. Such flexibility existed in this case, and the incorrect diagnosis could only be made by giving undue value to some of the more prominent symptoms presenting. Even in those cases of neuromimesis where a certain degree of spinal rigidity exists, it will generally be found, as in the cases of joint disease I have described, that a persistent effort—not a forcible one—will overcome it. Nor must we mistake the acute and the sub-acute muscular affections for the reflex muscular spasm of chronic spondylitis. I have seen some cases, especially in the cervical region where a differential diagnosis was difficult, but in a great majority of neuromimetic spines you will find muscular lassitude rather than muscular rigidity : inability to hold the spine erect and a flexible excurvation rather than an alert muscular spasm which assists in protecting the diseased parts from concussion and aids in forming the compensatory, antero-posterior curves which are such a striking feature of caries of the vertebræ when deformity exists.

CASE 10. Miss M. A., æt .14. Resides in N.Y. State. The hered-

itary history of this patient is very suggestive : two of her grand-parents—one on either side—had paralysis agitans : her maternal grandmother died of phthisis, a tendency to which exists in this branch of the family, two of her aunts dying therefrom, and her father's family are subject to chorea. Two of the patient's broth-ers have died of " brain disease," and a sister is " very nervous."

As a child the patient was " very quick and nervous," of active mind, and had no serious illness up to the age of eleven years. She seemed prone to assume responsibilities beyond her years, and sought the society of adults, and has always been a very affection-ate and emotional girl. Three years prior to my examination of the case, she developed symptoms of a strongly emotional charac-ter which affected " principally the back." She had very severe pains in the dorsal region which prevented any movement of this part for several weeks. This was followed by several typical hysterical symptoms. While recovering from this condition, her little brother removed a chair upon which she was about to sit, and she received a severe concussion of the spine. The symptoms of trouble in the back now became very urgent : any movement of the vertebral column produced pain which, at times, seemed to encircle the body and frequently found its most marked expres-sion in the abdomen and chest. The spine began to " project backward and twist sideways," and any jar or movement increased the pain greatly. The recumbent position was the only one she could tolerate, and she had kept it for many months prior to my examination.

Residing 400 miles from the city, she was brought here in a spe-cially prepared compartment of a sleeping car, and was conveyed to her hotel on cushions. A diagnosis of Pott's disease had been made by the family physician, and strict injunctions had been given to avoid any shock or jar to the patient.

On examination I found a very marked excurvation of the spine which, however, immediately disappeared in the prone position, and a lateral deviation which yielded easily to manual pressure. The right scapula was lower and more prominent than the left. There were various points of tenderness over the spinous pro-cesses. Patient was unable to stand alone. Pain existed not only posteriorly, but anteriorly also—like the " gastralgia " of chronic spondylitis. There was no muscular rigidity, the vertebral column being normally flexible in all directions. There was no contrac-tion of the psoas muscles, and the strictly involuntary symptoms which accompany true, chronic spondylitis were absent.

Good authorities tell us that pain on concussion of the spine, especially if accompanied by pain in the anterior part of the thorax, indicates Pott's disease, and it is certain that in typical cases these symptoms do exist. In this case they formed the prominent subjective symptoms, and if taken alone would be very apt to mislead. There was also a posterior curvature accompanied by lateral deviation, which latter not unfrequently occurs with the kyphos of Pott's disease. But the kyphosis, as well as the scoliosis, was easily removed, and instead of the ever present muscular rigidity of chronic spondylitis, was found a normal degree of flexibility of the spinal column.

A diagnosis of neuromimesis was not well received. The mother of the patient expressed herself as disinclined to accept it, so positive was she that disease existed. After some hesitation it was finally decided to follow my advice, which was simply to ignore the pain and the deformity and to accustom the patient to gradually progressive exercises. A tonic treatment was also advised. After three weeks the patient was able to walk, and after six weeks she went home suffering little or no pain. Progress after her return was gratifying. Recovery was complete without relapse.

The prominent symptoms of chronic spondylitis, before the appearance of the characteristic deformity, may be briefly described as follows :

1st. Rigidity of the vertebral column at the point of disease, this rigidity being, in a great measure, due to the persistent reflex muscular spasm which has already been described as occuring in chronic osteitis of the knee and hip.

2d. Pain, which, like the pain of hip or knee-joint disease, may find expression orally, or give evidence of its existence by the apprehensive state already referred to. When the patient locates the pain, he generally describes it as occurring in the region to which the spinal nerves of the diseased

region are distributed. The pain is aggravated by any sudden motion or unexpected jar. The same kind of involuntary symptoms, the nocturnal cry, etc., are found in many cases of chronic spondylitis in the prodromal stage. In some cases the disease progresses so insidiously that the actual deformity is the first symptom noted by careless observers.

3d. A characteristic attitude and gait, which are imparted, partly by the unremitting reflex spasm (which frequently obliterates the normal curves of the spine), and partly by the instinctive effort of the patient to avoid concussion or shock to the diseased surfaces.

I do not doubt that the same muscular atrophy occurs in chronic spondylitis that is found in chronic epiphysitis of the knee and hip. The difficulty of demonstrating it in certain muscles is apparent.

In neuromimesis of chronic spondylitis the pain is generally superficial, and is, almost always, located over or near the spinous processes; it is sometimes transient, and frequently changes its location from time to time. In Case 10 the pain appeared on the anterior surface of the body, but disappeared under the curative effect of exercise. In place of the reflex muscular spasm, which holds the vertebral column so rigidly in chronic spondylitis, and which prevents the reduction of the kyphos, there is generally found as before stated, a normal degree of mobility of the spinal column under properly directed manipulations. There is no nocturnal cry, and the facial expression of apprehension, which is generally marked in the sufferer from Pott's disease, is so far wanting that the expression of many neuromimetic patients is even merry.

The general conclusions reached regarding the knee joint are as applicable to the spine as to the hip, excepting those, of course, which pertain exclusively to the knee as a distinct articulation.

If we recall the symptoms presented by the two cases of simulated chronic spondylitis which have just been related, it would appear that the danger of diagnosing true *lateral curvature of the spine* in similar cases would be great. Each of these patients presented a distinct lateral spinal curvature, accompanied by a malposition of the scapulæ, and these symptoms also occur in true scoliosis. Indeed, cases of nervous mimicry of true, rotary, lateral curvature are very frequent, and, inasmuch as the mimicry is often very close, we should, in suspicious cases, be very careful in our analysis of the symptoms presented. Fortunately, the error of calling a hysterical spine a true lateral curvature is not so likely to be followed by serious results, as is that of attributing to " habit " or " hysteria " the progressive curvature of true scoliosis, than which there is nothing in the whole range of orthopædic surgery more insidious in its onset, or, when it is fairly established, more difficult to arrest, even by means of the rejuvenated gallows, and the much lauded plaster of Paris bandage.

The almost constant association of emotional symptoms, of greater or less intensity, with the condition of true, rotary, lateral curvature, has led many to suppose that the former was, in some unexplained way, a factor in the production of the formidable conditions met with in the latter. My own experience leads me to say, while recognizing the fact that the majority of cases of true scoliosis are found in emotional girls, and that mental activity is its frequent attendant, that I am no more prepared to admit that this emotional state, or mental activity is the cause, or even a cause of true scoliosis than is the oft-noted precocity of strumous children a factor in the production of chronic joint disease. In either condition the emotional state, on the one hand, or the precocity on the other, is symptomatic of the general condition.

In true lateral curvature the dorsal curve presents to the left more frequently than is generally supposed, and in my own experience it occurs in males oftener than has been stated. Of 83 consecutive cases, occurring at the Orthopædic Dispensary and Hospital, 21, or 34 per cent. presented a left dorsal curvature, and 18, or $27\frac{1}{2}$ per cent. were males. Adding to this the fact, which I deduce from the examination of several hundred patients, that in no two cases do we find exactly the same curves, and that it is exceptional, in a group of cases, to see the same number of vertebræ involved in the primary (dorsal) curvature, and we reach the conclusion that we must look for our primary muscular factor, in the production of true lateral curvature, to the, strictly speaking, intervertebral muscles, rather than to those which, taking their origin at some other part of the skeleton, have their insertion in the flexible vertebral column. I cannot stop here to enter at large into the field which this conclusion opens. My study of neuromimesis of lateral curvature has assisted largely in reaching this con- clusion, which is secondary to other conclusions that are stated in my monograph on Pott's disease, already alluded to. I hope soon to be able to especially consider these and other interesting points in the etiology of lateral cur- vature, and regret that the time allotted me forbids my doing it on this occasion.

The fact that lateral curvature was very frequently ac- companied by hysterical manifestation, is mentioned by Laycock. In his valuable treatise* he ascribes lateral cur- vature to "hysterical paralysis," and mentions the opinion of Stromeyer that the *serratus magnus* is involved in the production of the curvature, a view which has since been entertained by other writers. But there is this difference between the lateral curvature of hysterical origin and true

* An Essay on Hysteria. By Thomas Laycock, Philadelphia, 1840.

scoliosis. The former partakes of the character of *functional weakness*, especially of those muscles which act upon the spinal column extrinsically, while the latter is due to a progressive muscular contraction, dependent upon causes yet to be pathologically ascertained, but which appear to primarily affect those muscles which act intrinsically. The hysterical form does not become true scoliosis, in my own experience, unless the specific, pathological cause be added, and we may, perhaps, infer that this specific cause is more apt to be developed in the hysterical diathesis, just as we may say that chronic joint disease is more apt to occur in the strumous diathesis. Whatever the pathological condition may be, that induces the peculiar condition known as rotary lateral curvature, we at least know that the muscular contraction is both a painless and a progressive one, and that it resembles in character that found in true torticollis, in congenital club-foot, and, in many instances, in infantile paralysis. The conditions found in true torticollis, especially resemble those which are apparent in true lateral curvature, and that this condition is one of *contracture* rather than simple contraction, is confirmed by Paget, who says, in speaking of neuromimesis of lateral curvature: " If these signs of distinction are not enough, ether or chloroform will help. You can straighten the mimic curvature when the muscles cannot act ; you cannot so straighten a real curvature."*

Recognizing then the character and persistency of this contracture, it is always a matter of difficulty—if it is not an impossibility, in the absence of symptoms in the earliest stage—to determine just when the efficient cause of the progressive scoliosis commences to operate. When the spine is markedly curved, and rotation is apparent, the diagnosis is not difficult, and while the tendency of true scoliosis is to

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* Op. cit., page 229.

become very slowly worse, and to result in irremediable
deformity, the hysterical curvature, if properly treated,
sooner or later recovers, just as do the emotional contrac-
tions of the hip or knee.

The early stage of hysterical lateral curvature, and the
first (apparent) stage of true scoliosis, however, present
many features in common, and as before mentioned, the
emotional element is almost uniformly present in each.
This adds to the difficulty of diagnosis—and has led to
many errors.   For instance, a young girl applies for advice.
The early history presents no remarkable features.   She has
always been well—but not rugged—has grown rapidly, and
has become, of late, somewhat nervous and easily excited.
Mentally, the patient is quite active,—is fond of reading—
and, may be, is proud of her position in class.   It may be
also, that she is fond of out door sports, but on the one
hand everything which the patient does is accomplished
with a tireless sort of energy or, on the other hand, she may
go to the other extreme, and be very listless and languid.
Her parents will tell you that lately the spine has become
crooked.   That one of the shoulder blades is quite promi-
nent.   The patient does not sit errect, and when she stands
one leg is flexed, and "the hip" on the side opposite the
flexed leg, is prominent.   They fear that their child will
become permanently deformed,   An examination shows a
curved spine, a prominent shoulder blade, a tilted pelvis
with asymmetry of the trunk, especially between the free
border of the ribs and the iliac crest on each side.   There
are tender spots over the vertebrae, hyperæsthetic areas
that change from time to time, complaints of back-ache,
sometimes head-ache. There may be also irregular or pain-
ful menstrual periods, etc.   With a history like this before
us, the question arises: Have we here a condition that de-
mands mechanical support, or shall we simply remove all

exciting causes and place the patient on her own resources ?
If it be a condition of true scoliosis proper treatment cannot
be too soon commenced, or too rigidly enforced. If it be a
simple "hysterical spine" the course to be pursued is
wholly different.

It is not unusual to find a history closely resembling the
above developed in a true and unmistakeable scoliosis.
Generally, however, in this condition the symptoms are
objective, rather than subjective. The spine is curved, the
shoulder projects, but the patient has no knowledge of
these signs herself. Her first intimation that her figure
was not perfect, was derived from some closely observing
friend, or the dressmaker. There may be no pain at all.
The disturbed muscular action, whatever be its cause, does
its work painlessly, but none the less surely.

Rotation of the vertebræ is described by Barwell, Adams,
and others as occurring very early in the history of true
scoliosis. My own experience confirms this, and its value
as a diagnostic sign in the first stage is very great. In my
own experience also the first (apparent) stage of true sco-
liosis is always accompained by a modification of the lateral
flexibility of the vertebral column, in the dorsal region,
while in the nueromimetic state, this modification does not
exist. The loss of symmetry between the scapulae in true
scoliosis depends, mostly, upon the acquired position of
the ribs, and in the mimic state, there is a simple
debility of the scapular muscles, without any change
in the ribs whatever.* In the simulated state there is
generally an excurvated spine with a lateral deviation,
while in true scoliosis the curvature is lateral wholly, with
compensatory or double curves. And these facts enable
us to mention the symptoms, which when found, render

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* Paget remarks "the vertebræ are little or not at all rotated, as they are in
well-marked cases."—Op cit., p. 229.

the diagnosis of lateral curvature certain, viz., rotation of
the vertebræ, and marked resistance to lateral flexion on
that side toward which the convexity of the dorsal curve
looks.

Another point is this: Like the symptomatic lateral
curvature found in chronic coxitis, or which arises from any
cause which affects the transverse pelvic plane, the neuro-
mimetic spine becomes straightened, and the scapulæ as-
sume their normal relations when the patient is placed in
the prone position. Absolute rest of the long, extrinsic
muscles of the vertebral column is all that is necessary to
restore the parts to their normal position. After very evi-
dent rotation and marked lateral resistance are met with,
recumbency fails to wholly annul the curvature, though in
removing the contributive cause of gravity, which acts ver-
tically when the patient sits or stands, the position of the
shoulder blades and the curvature itself becomes consider-
ably modified.

But if, after examining a patient carefully, making accu-
rate notes of your observations, you should still fail to
reach a satisfactory conclusion, it may be deemed advisable
to ask another examination at an early day. If during the
interim any marked change in the symptoms occur, the
evidence is strongly in favor of neuromimesis. There is
" no alternation of increase or remission" in the muscular
conditions, or the deformity, in true scoliosis. The shoul-
der blade does not change its position from day to day.
The curvature and the rotation progress slowly, obeying
the mandates of the incessant muscular contraction, but so
slowly, that weeks may elapse without presenting any ex-
ternal change that the eye could appreciate. In the mimic
state various and sometimes very marked changes occur in
a few days. And if we find that these variations are not
associated with the permanent features of the true scoliosis,

which have already been mentioned, there is no doubt as
to the existence of a neuromimetic state.

The treatment of hysterical lateral curvature will depend
very greatly upon the extent of the debility of the extrin-
sic spinal muscles, and the consequent malposition of the
spine and scapulæ. In many cases we can overcome the
purely functional inertia of the spinal muscles, by suitable
exercises, etc. But if the patient be a rapidly growing girl,
either just approaching, or just past her menophania, more
radical measures may be demanded. If the muscular lassi-
tude be great, and the malposition a *constant* attendant of
the standing or sitting position, it has been my habit to
apply a very light and closely-fitting *elastic*, steel support.
By its use we can succeed in antagonizing the dorso-lumbar
excurvation, and thus secure the normal antero-posterior
curves of the vertebral column. If the normal antero-
posterior curves are successfully maintained, the lateral
deviation as well as the drooping scapula seem to care for
themselves.

This support consists of, 1st. Two light steel uprights,
bent in the line of the normal curves of the spine, with the
anterior dorso-lumbar curve slightly exaggerated. These
uprights are then tempered; 2d. A pelvic band, reaching
from trochanter to trochanter, to the centre of which these
uprights are rivited, as in the conventional spinal brace
for Pott's disease; 3d. An anterior bandage or "apron,"
which secures these uprights and the pelvic band firmly
against the body; 4th. The customary axillary pads, which
pass from the upper termination of the uprights (about the
second dorsal) to a crosspiece opposite the lower angles of
the scapulæ. The resistance afforded by this simple sup-
port is sufficient to hold the vertebral column in the desired
position, and yet the apparatus in no way interferes with
natural or even graceful movements; and the muscles,

though supported, are not deprived of exercise and use.
This support also is worn a part of the day only, as a
rule, suitable exercises, massage, faradism, etc., being used
as circumstances indicate.   Usually the support can be re-
moved after a few weeks or months.

If space permitted, I might add cases illustrating neuro-
mimesis of disease of the ankle, elbow, wrist and shoulder
joints.   And I have seen two or three mimic cases that
might easily be called sacro-iliac disease, so closely did the
symptoms coincide with those which have been recently
described as being present in the first stage of this truly
formidable lesion.   It would be impossible, however, to
cover the entire field of the nervous mimicry of joint dis-
eases in one evening.   The same rules, and the conclusions
deduced from our study of the mimicry of knee, hip and
spine diseases, are equally applicable to the differential
diagnosis of the true and false lesions of other articulations.

Hysterical club-foot is not of very frequent occurrence,
though a distorted ankle joint may frequently accompany
other contractions of an hysterical character at the knee and
hip.   Laycock states, " that local hysterical paralysis will
give rise to a distortion of the foot,"* and Shaw† describes
a case in which the " ankle was at this time turned round,
so that she walked on the outside of her foot."   Dr. W. J.
Little, in his classical treatise on Club Foot,‡ thus describes
the position of the foot in a case of talipes varus acquisitus
(hystericus) in a girl of 19 : " its outer margin alone touch-
ing the ground, the sole presenting vertically backward, the
tibialis anticus, tibialis posticus and gastrocnemii tendons
being tense from contraction of their respective muscles,
and toes firmly incurvated ; she was unable to rest on the

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* Op. cit., page 130.

† Further observations on Distortion of the Spine. By John Shaw, page 184,
London, 1825.

‡ Club Foot and Analagous Distortions.   By W. J. Little, M.D., F.R.C.S.,
page 229.   London, 1839.

limb, the attempt being followed by an outward yielding of the tarsus, which brought the superior surface of the os cuboides to the ground. Locomotion could only be effected with crutches." Another case is also mentioned by the same writer: " Wherein contraction of the right anterior tibial muscle has been erroneously considered the sole cause of the distortion, and for the cure of which its tendon had been divided. I found that contraction of the posterior tibial muscle was the cause of the continuance of deformity."

Skey relates the following very interesting case :*

" In the year 1864 a young lady of 16 years of age was placed under my care under the following circumstances :

For eight months prior to her visit to me, she had been suffering from inversion of her left foot, which was so twisted as to bring the point of the foot to the opposite ankle. * * * Her family consulted a surgeon of much experience in the treatment of distortions and of orthopædic notoriety. The case was considered as an example of an ordinary distortion, and the foot was placed in a very elaborately made foot splint, by the force of which it was made to approach a parallel relation with the other foot ; but it was an approach only, for no mechanism could retain it in a perfect position, the toes yet in some degree pointing inward. Months elapsed, and the disease continued unchanged. A second orthopædic authority was then consulted, in conjunction with the first, and as no new light was thrown on the disease by the combined opinions of the two, the same principle of treatment was recommended to be continued, and the mechanism was somewhat more elaborated. * * * When the apparatus, which she had worn so long was removed on the occasion of her visit to me, her foot immediately resumed its twisted form. * * * The disease had appeared almost suddenly, in a person hitherto healthy. It could not be due to congenital deformity, and the limb gave no indication of disease or disorganization. There was neither pain, heat or swelling. In this case, also, there was no catamenial derangement.

I removed the apparatus from the foot, bandaged the limb with a calico roller, ordered a full, nutritious diet, with bark and iron,

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* Op cit., page 104.

and having explained the nature of the disease to a friend, sent the young lady home into the country, recommending her to rely on the kindly offices of nature—the greatest of all doctors, ortho- pædists not excepted. At the end of a month some progress had been made, but not a great deal. She still walked with some dif- ficulty, but it was obvious that she was improving in health and vigor of system. At the expiration of six weeks she accompanied her family to a ball, her foot, as she entered the ball-room being not yet restored to its normal position. She was invited to dance and under the novel excitement she stood up, and, to the as- tonishment of her family, she danced the whole evening, having almost suddenly recovered the healthy muscular actions of the limb! She came to see me two days afterward. She walked perfectly well into my room, and paced the floor backward and forward with delight. The actions of the limb were thoroughly restored, and all traces of the previous malady had disappeared."

Charles Bell also relates a case * in his work on "The Nervous System of the Human Body." Charcôt mentions "a most interesting case," communicated to the Medical So- ciety of Ghent, by Dr. R. Boddaert.† Adams dismisses the matter with the following remark: " A very severe and obstinate form (of talipes) is observable in young girls which is evidently connected with hysteria, and I need hardly say that in these cases the treatment must be direct- ed against the general, rather than the local affection." ‡ Brodhurst relates very briefly a case in which certain mus- cles were contracted, bringing " the outer edge of the anter- ior portion of the foot to the ground, the inner surface be- ing raised, and the heel fully an inch from the ground,"§— but this condition was not permanent, and occurred during the catamenial periods only. Not to refer individually to all the authors who have written upon orthopædic surgery or club foot, I will briefly state that the seeker after infor-

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* Referred to by Charcot.

† *Annales de la Société de Médecine de Gand,* 1859, p. 93.

‡ Club Foot. Its Causes, Pathology and Treatment, by William Adams, F. R. C. S. 2d ed. London, 1873.

§ Brodhurst on " Club Foot." London, 1856.

mation upon hysterical deformities will be greatly disappointed, especially when consulting the most popular American authorities. Many writers on diseases of the nervous system also practically ignore this subject—or merely mention the existence of such conditions, and several works which I have consulted do not even refer to hysterical club foot. As the nervous mimicry of club foot is not always easy of diagnosis, and as the treatment required is different from that which is applicable to the ordinary forms of talipes, the errors likely to ensue make a brief study of these cases profitable.

I have seen four cases of hysterical club foot. In one of these cases there was contraction also at the knee and hip. In one (Case 12), the distortion came on after emotional excitement, and other symptoms which will be described. The third occurred in my private practice and was placed, at my request, in St. Lukes Hospital, where it was attended conjointly by my friend and colleague, Dr. G. G. Wheelock and myself. This patient, a precocious and emotional girl of 11, presented many peculiar symptoms, and was discharged unimproved. She afterward recovered at home, I am informed, under severe measures instituted by her father. The following case may, however, be called a typical one, and as ample opportunity was afforded for several examinations, I append the history in full.

CASE 11.—In June, 1878, I was called to see Miss H——, aged 19, living on Long Island, at the suggestion of Dr. A. G. Thompson, of Islip. The patient was incapacitated by a club-foot—which was almost daily becoming more troublesome.

The history developed was as follows: In a hereditary sense there was nothing of special importance, except that a paternal aunt had "died from some lingering nervous disease." The parents of the patient were living and were in good health.

The patient had rheumatism when she was three years old, and for the three or four years succeeding this attack suffered from

recurrence of the same disease. Up to the age of fourteen, when menstruation appeared, she had been otherwise healthy. At the age of fourteen a severe attack of inflammatory rheumatism occurred. In 1877, my friend, Dr. Charles W. Packard examined the patient and found her to be suffering from organic heart disease, a condition (aortic regurgitant), which was evident at the time I examined the case. The patient had never been especially emotional, and, to outward appearance, was in good health.

On the evening of February 22, 1878, she was seized with difficult breathing, pain in the region of the heart, and various, irregular, convulsive movements. There was, in the course of the next few days a repetition of these attacks, and they finally culminated in typical hysterical convulsions, with opisthotonos, etc. Various remedies were used, and after many fruitless efforts it was found that they could be best controlled by full doses of morphine. The effect of these attacks was to induce great debility. The patient could walk very well, but there was no deformity of the foot. Soon after, with no other manifestations of importance, the urine became suppressed, and for 72 hours there was, apparently, no urine secreted at all. When the bladder was emptied, there was found to be only a comparatively small quantity. Morphine accomplished more than any other remedy in temporarily restoring the secretion of urine, as in the case of hysterical anuria recently reported by Drs. McBride and Mann.* After this, on several occasions, hysterical symptoms manifested themselves, until, on April 21, 1878, the patient began to walk upon the outside of the right foot. There was no pain in the limb anywhere, except that occasioned by undue pressure over the cuboid bone.

After the appearance of the deformity the patient became greatly disinclined to take exercise of any kind, partly on account of the pain produced by walking, and partly on account of an avowed indifference. Her principal occupation had been embroidery or reading. At the time of examintion she walked with a very awkward gait, limping very much, and the knee seemed to possess very little strength. The position of the foot was that of uncomplicated varus. The abductor pollicis pedis, the plantar muscles, the tibialis posticus and anticus as well as the gastrocnemius were very rigid, and the ankle-joint seemed actually anchylosed. I made various attempts to overcome the evident muscular contractions, but without avail. The position was not changed by ma-

* A case of Hysterical Anuria Cured by Restoring a Lacerated Cervix Uteri. ARCHIVES OF MEDICINE, June, 1879.

nipulation during sleep. There was slightly reduced sensation below the knee, but no hyperæsthetic areas existed. There was no atrophy.

A diagnosis of hysterical contracture was made. The warm weather was approaching, and it was deemed advisable to give the patient the benefit of a change of scene and air, with the hope that spontaneous recovery would ensue.

On September 12, 1878, the patient came to the city improved as to general health. Neither seashore nor mountain air had, however, affected the condition of the contracture. Before instituting any decided measures in the way of treatment, I thought it best to ask for a consultation, in view of the cardiac complication. Dr. E. C. Seguin examined the patient with me, and a course of treatment was decided upon, and the parents of the patient were informed as to the condition of the heart, and the possible effect of treatment, both upon the heart lesion and the deformity itself. After due deliberation, the father decided to make no effort in the way of treatment. The patient returned to her home, and has since remained tolerably well, though I am informed that, of late, the opposite foot has shown a decided tendency to assume the same position as the one which was first deformed.

The position of the foot is shown in the accompanying engraving. As a matter of comparison, both feet are represented. It will be noted that, in addition to the varus position, there is a peculiar and extreme flexion of the toes. In every case of hysterical talipes I have seen this same peculiar flexion occurred, and a reference to Charcot's cases of hysteri-

cal contracture of the lower extremities, will demonstrate this same characteristic sign of hysterical affections of the foot. In true talipes this condition does not often exist, and its presence may be looked upon as an indication of the hysterical state.

The following case presents many interesting and instructive features, and illustrates the many phases "hysteria" may assume in boys of tender years, including even a neuromimesis of club-foot.

CASE 12.—Willie M——, aged 10 years, residence Bridgeport, Connecticut. I saw the case first in consultation with Dr. D. H. Nash, September 29, 1877. Hereditary history good : no circumstance to note in early life.

While attending a military review in August, 1877, the patient fell, striking his back against the fluke of an anchor. The third lumbar was the point of injury and the evidences of the contusion caused thereby were evident for several days. While they were still present, about one week after the fall, he complained of weakness in his limbs, and, one night when ready for bed, he said he could not walk ; he crawled up stairs on his hands and knees. The following morning he was much worse, was unable to stand alone and complained of great pain. The family physician was called in, who, after hearing the symptoms, asked " Have you hurt your back in any way ?" Not an unnatural question under the circumstances, and the patient who had apparently forgotten the fall, recalled it and related the circumstances thereof to the doctor. The spine was examined and a tender spot discovered at the point of injury. Counter irritation (croton oil), and rest were prescribed. The patient became worse : extreme pain in the back prevented his being moved in bed and soon he could not move his limbs. Then there was an apparent loss of sensation, for he professed utter indifference when pinched, or even pricked with a needle, especially in the right lower extremity ; both limbs, especially the right, became cold. Such was the history given to me by Dr. Nash and the parents of the boy. I copy the remainder from my case-book.

Examination.—September 29, 1877. Patient in bed ; countenance pale and apprehensive ; complains very much at any attempt to change position ; severe pain located in back in region of third

lumbar vertebra ; pulse 95 ; auxiliary temperature 98.4°. Is unable
to move lower extremities, which show a reduced temperature as
tested by Seguin's surface thermometer. Normal joint motion in
lower extremities, except at the right hip joint where a marked
psoas resistance was met, such as is frequently found in the first
stage of chronic spondylitis, in the region suspected ; but this re-
sistance yielded to a gentle and continuous force ; rotation of
thighs normal. At the expense of a good deal of pain, the verte-
bral column was proven to be normally flexible in all directions
at the point of injury. The faradic reaction of the muscles of the
left leg and thigh was normal, taking the biceps humeri as the
standard. On the right side, however, there was a very evi-
dent reduction, in the reaction of the quadriceps extensor
femoris and the peronei. There was also a very consider-
erable anæsthesia, especially of the right thigh and leg. A further
examination of the vertebral column by palpation, demonstrated
pain on slight pressure at the seventh cervical vertebra and at the
point of injury, which still showed the peculiar eruption of the
croton oil.

In the vicinity of the third lumbar there was marked hyper-
æsthesia ; bladder and rectum normal, though the former had per-
formed its function with some hesitancy. No cerebral symptoms ;
reflex movements as induced by titillation of the soles of the feet
very considerably reduced on both sides. No apparent atrophy of
either limb ; limbs equal in length and circumference.

There was no history of fever, though early thermometrical ob-
servations had not been taken, and no other acute symptoms were
noted than those above mentioned. The apparently excruciating
pain was excited by any movement, especially by a sudden jar ;
it was with great difficulty that the patient was raised sufficiently
to permit the use of a bed pan, and the bed linen though soiled,
had not been changed for many days.

In reviewing the case in consultation, I declined to
make a positive diagnosis with only one examination.
Two conditions presented : a lesion of the spinal column
(which had been strongly suspected) was eliminated by
the normal flexibility of the spine at the suspected point
and the absence of other symptoms which would positively
indicate chronic spondylitis.

1st. An obscure lesion of the spinal cord, the early symptoms of which had been overlooked, leaving a slight sensor and motor paresis of the right leg. The fact that the external evidences of injury were located below the termination of the spinal cord was commented upon at the consultation.

2d. A neuromimesis. I inclined decidedly to the latter, and so expressed myself. I advised the continuance of the recumbent posture, tonics, and recommended a careful avoidance of any allusion to the patient's condition in his presence, and suggested that the counter irritants be discontinued. The patient was to be lifted daily upon a blanket, and the bed linen changed. A second consultation was arranged for a few days later.

October 3d.—Upon entering the room, I proposed to move the bed so as to obtain a better light. To this the patient made urgent objection, and burst into tears. A promise that the bed should not be moved restored his equilibrium. Axillary temperature normal ; pulse 85 ; no change in the faradic reaction of the muscles of either limb ; anæsthesia still present ; apparent psoas contraction which yielded to manipulation as before. The pain in the back was worse rather than better ; appetite fair ; bladder and rectum normal ; but *the muscles of each lower extremity were very rigid*, and it required both time and tact to demonstrate that this rigidity could be overcome, but the patient's mind being diverted, this condition ceased suddenly, and free passive motion was permitted, but apparently at the expense of greatly aggravating the pain in the back. Adherent prepuce and masturbation had been eliminated from the case.

The irregular character of many of the symptoms, the exaggerated quality of those that did present with anything like constancy, the absence of definite indications of a cord lesion, and the certainty that there was no osseous lesion, determined the case, in my mind, to be hysterical. Feeling that I had the confidence both of the parents of the child and of the child himself, I deliberately

lifted the boy from his bed, bore him across the room, and placed him in an easy chair by the window. Supporting the rigid limbs first with my hands, and then upon my knees, I called his attention to some passing object. The rigid muscles again relaxed.

After some assumed hesitation on my part, I permitted the patient to sit up for half an hour, watching him closely. The pain in the back disappeared, and when I left to return to town, he was sitting up in his bed, eating his supper with good relish. Instructions were given to make him leave his bed the following morning. He was to go out of doors every day, where he was to be allowed to do as he pleased. The following, quoted from a letter which I received from his father a short time after, will show the success of this plan of treatment : " Your patient sat up on Sunday (the day following your second examination), walked all about the house on Monday, was out of doors walking and riding on Tuesday, and every day since he has kept it up. He walks a little stiffly or weakly, but without a cane or any as- sistance." The improvement continued, and the boy soon walked naturally.

About three weeks later the father of the patient found it neces- sary to deny him some favor which he had asked. The pa- tient sobbed convulsively, threw himself upon the floor and cried bitterly for upward of an hour. The father did not yield, and the child finally submitted and went to bed. The next morn- ing a new symptom developed. The *left foot* assumed the posi- tion of talipes equino-varus. I was again summoned to examine the boy, whom I found playing ball, but walking very badly. Had it been the *right* foot that was affected, I would not have been surprised, for the peronei of the right leg had shown a di- minished faradic reaction at both of my previous examinations. An examination, however, cleared the matter up : the peronei of the left leg showed normal contractility, the right alone giving diminished reaction. No other new symptom presented. Pain in the back had wholly disappeared, though the anæsthesia of the

right leg still remained to a slight extent. The psoas contraction was gone. No attention was to be given to the "turning of the foot," and stimulated by a promise that he should have some money with which to buy Christmas presents if he overcame this trouble, it gradually disappeared, and has never returned.

The diminished faradic reaction, the anæsthesia, the unilateral psoas contraction and the greatly modified reflex action were the symptoms in this case that threw doubt upon the diagnosis. They are all compatible with the early hysterical state except the one first mentioned, and this condition remained after the boy's recovery.

Great care is necessary in determining the quality of the faradic reaction in suspected muscles, where the modification of the contractility is slight. My usual procedure was suggested by Dr. Seguin, and serves a good purpose. I use the five-post Kidder (tip) battery, and first find the normal reaction of the biceps humeri. With this as a standard, I test the muscles of the sound limb, and the superficial muscles will generally respond to the same current. The cylinder of the battery is marked in fractions of an inch. I then test the suspected muscles with the same current, and increase its strength until the point of evident reaction is reached. A difference sufficient for diagnostic purposes can thus be demonstrated.

The treatment of hysterical contracture * is, as a rule,

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* I am indebted to my friend, Dr. Mary Putnam Jacobi, for the following extract from Duchenne's " *De l'électrisation localisée,*" 2d ed., p. 926. " The following is a remarkable example of a rapid cure of an hysterical contracture of the masseters, which had existed for two years." Obs. CCXIV (condensed). The contracture came on without any appreciable cause other than the hysterical state. Alimentation being difficult, an apparatus had been made which maintained the jaws slightly apart, and which was constantly worn. The contracture disappeared under chloroform, but it reappeared. It had disappeared spontaneously on one occasion, and had existed continuously for six months, when, after failure under the care of Drs. Campbell and Nélaton, it came under Duchenne's observation. The contracture disappeared entirely under the influence of " electro-cutaneous excitation "—two applications.

A case of hysterical contraction of the thumb, in a girl of ten, recently applied at the Orthopædic Dispensary. It had existed for several months. The patient

very unsatisfactory, and the issue is sometimes doubtful. Many cases recover spontaneously, while others persist for years.

In one of Dr. Little's cases of hysterical club foot, operative measures were completely successful. In other cases, after various remedial agents had failed, recovery has taken place at a time and under circumstances which involved an unexpected demand upon the volition of the patient, or under some form of emotional excitement. Purely mechanical treatment is apt to prove very unsatisfactory, and if used at all, preference should be given to cases of confirmed hysterical paralysis, where all other means have failed, or to the more exaggerated forms of hysterical spinal curvatures, where some simple, *elastic* support is indicated. And even in these instances, the use of apparatus should be made secondary to other measures. The application of mechanical force to overcome the deformities induced by hysterical contracture is positively contra-indicated. In the case of Miss H., Dr. Seguin proposed the use of atropia, hypodermically, in heroic doses, and the application of faradism, locally. The use of apparatus was not even discussed.

At his examination of this patient (Miss H.,) Dr. Seguin tested the electrical conditions of the muscles of the affected limb. The following is extracted from his note-book :—" External popliteal nerves react equally (both sides) to faradic current of weak power; muscles of anterior tibial and of peroneal regions react on both sides to same current, but right peronei contract less because of their stretched state. Galvanism (25 elements) to external popliteal nerves gives

wore, under my direction, a splint for about ten days. She was then transferred to Dr. Clovis Adam, Electro-Therapeutist to the Dispensary. Three applications of a strong faradic current to the antagonistic muscles produced a complete recovery. And Dr. Adam also reports a case, in a woman of 25, of hysterical contraction of the hand and thumb, also completely relieved by similar measures.

normal and jerky contractions on both sides. Knee tendon reflex moderate and equal on both sides."

My own examinations of the muscles, made both before and after Dr. Seguin's tests, agreed with the above. I also found a normal response from the contracted tibialis posticus—the same current producing contractions on either side, the extent of the contraction being only less in the affected muscle, and this was due, I infer, to the fact that the muscle was shortened.

Charcot describes the prominent feature presented by this case as *permanent contracture*, and refers to it as being among " the most interesting peculiarities connected with the singular manifestation of hysteria." * He presents several cases which are fully detailed, and the conclusions reached are very valuable, and especially so to us in our study of the muscular conditions, as applied to deformities. This eminent writer says : " We have here a permanent contracture in the rigorous sense of the word. I have assured myself that it is in nowise modified during the profoundest sleep ; in the day-time there are no alternations of increase or remission. The slumber alone which chloroform produces causes it to disappear if the intoxication produced be considerable. * * * The nutrition of the muscles has not sensibly suffered and the electrical contractility remains nearly normal." †

The diagnostic value of purely functional atrophy, of the effect of the anæsthesia induced by chloroform or ether, and the electrical test, in the conditions I have attempted to describe, are again made evident by Charcot's testimony. Indeed, in obscure cases, they form very valuable aids to diagnosis. It does not answer, as we have seen, to assume that, because a patient is hysterical, that all the symptoms

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" On Diseases of the Nervous System. New Sydenham Edition, 1877. page 283.

†Op. cit., page 285.

partake of this character, however closely the obscure, but real, symptoms may resemble the nervous. And if, in a moderately emotional woman, for example, a condition of hysterical contracture should exist at the hip-joint, with other symptoms closely resembling hip disease, the difficulties of diagnosis can be very easily appreciated.

Briefly, then, we may summarize our observations upon the muscular conditions in joint disease, in the emotional *contractions* and in the hysterical *contractures*, as follows:

1st. In chronic osteitis of the articulations there exists a specific muscular atrophy, due to the lesion; an invariable muscular spasm—which is present night and day, and which, while not modified by the customary doses of chloral or opium, disappears completely under the anæsthesia induced by ether or chloroform. There is present also a marked reduction of the faradic contractility of the muscles thus affected.

2d. In the emotional contractions we find the atrophy of disuse only,—a variable muscular rigidity which disappears during natural sleep, or yields to opium or chloral— and a normal faradic contractility.

3d. In the hysterical contracture we see a " permanent " muscular rigidity, which like the muscular spasm of chronic osteitis, is wholly dissipated by the profound anæsthesia of ether,—but we find in connection with it, functional atrophy only, and a normal faradic reaction of the muscles.

4th. The test of anæsthesia induced by ether or chloroform, as applied to the differential diagnosis of hysterical contraction and chronic articular osteitis is not of value, *per se*, though some eminent authorities have stated otherwise. Ether or chloroform will remove the " permanent contracture " of the one, and suspend the reflex spasm of the other. The elements of absolute contracture,—such

for example, as are met with in congenital talipes or torti-
collis, and intra- or extra-capsular changes (fibrous anchy-
losis, osteophytes, etc.,) being eliminated, we should bear
in mind, in making our examination of suspected joints,
under ether, Charcot's valuable deduction, viz., " that the
existence of a spinal, organic lesion, of more or less gravity
will be placed almost beyond a doubt, if under the in-
fluence of sleep induced by chloroform, rigidity of the
members gives way slowly, or even persists to any marked
extent." *

* Op. cit., p. 297.

REMARKS ON A FATAL RESULT FROM THE USE OF THE ELASTIC BANDAGE IN THE TREATMENT OF A POPLITEAL ANEURISM.

By ROBERT F. WEIR, M. D.

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Since the introduction of the elastic bandage in the treatment of external aneurism by Reid in 1875, some twenty-seven * cases have up to the present time been reported in the journals without any untoward accident having occured, though reasoning from analogy, two risks seem to be connected with this mode of treatmeut. These risks are, first, that the soft recent clot might give rise to inflammatory action in the sac, and second, that gangrene of the distal portion of the limb might result, either immediately or at a later period, from the severe and prolonged ischæmia. No case of inflammation or suppuration of the sac has in reality occured, and furthermore since it has been proven that such a complication is generally due to a traumatism applied either directly to the aneurism itself or to the artery near to it, it need no longer to be feared by the surgeon.

In respect, however to the second risk, to wit gangrene, I must refer, with your indulgence, to an article published in the *American Journal of Medical Sciences* for April, 1879, in which the clinical experience on the subject of the protracted arrest of the circulation of a limb is given by me as far as then could be collected. This experience was, to re-

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* Eighteen of which were successful, and nine failures.

capitulate briefly, as follows: that by the use of the tour-
niquet alone the blood circuit in an artery had been con-
trolled, for instance, by Murray for four hours for an aortic
aneurism; by Wheelhouse, for five hours by the complete
compression of the abdominal aorta for an aneurism of
the external iliac; by Durham, by proximal pressure on
the aorta for ten and a half consecutive hours; by Bryant
also by distal pressure on the same arterial trunk for
twelve and a half hours (in both of these latter cases
for aortic aneurisms); by Mapother, by complete compres-
sion of the femoral artery for nine and a half hours for
a popliteal aneurism, and by Erskine Mason by the con-
tinued compression of the femoral artery for eighteen hours
for a varicose aneurism. In all these instances no damage
to the integrity of the limbs took place, though coldness,
lividity and numbness existed in nearly all of them for
sometime after the removal of the pressure, and in Dur-
ham's case, which was a successful one, the coldness and
patches of purplish discoloration persisted for two days.
Other cases confirming the tolerance of the limbs to the
effects of instrumental pressure could, if desirable, be cited
where the circulation had been even longer interrupted.
Such cases are instructive though not as pertinent or con-
clusive as are the results of compression by means of the
elastic bandage of Esmarch. In this particular we of neces-
sity possess only a paucity of facts. Jeremoff and Cohn-
heim have shown that in the lower animals such a com-
pression of a limb could be borne innocuously from six to
eight hours, and on the human subject the rubber bandage
and tubing have been resorted to by Heath,* in one in-
stance for four and a half consecutive hours, and by Bar-
well,† with the elastic bandage alone for five hours without

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* *Lancet*, Dec. 1, 1877.
† *Lancet*, Jan. 26, 1876.

detriment to the limb. The most severe test, however, is the case * where for an obstinate hemorrhage in the hand the elastic bandage and tubing were applied to the arm for fourteen hours continuously, causing, on their removal, only intense swelling and redness of the previously compressed parts, which strongly simulated phlegmonous erysipelas. These symptoms, however, subsided in a few days though paralysis of the arm continued for several weeks.

My own experience in the treatment of external aneurisms by the elastic bandage is limited to three cases, two of which were successful, and the last one, which is the subject of the present remarks, with a fatal issue. In the first case, a femoral aneurism in which several ineffectual trials of Esmarch bandage without ether had been made, prior to the patient coming under my charge, success was achieved by the application of the rubber bandage below and above the tumor, with the coincident employment of the rubber tubing about the thigh. This compression was kept up under an anæsthetic for ninety-three minutes, when the bandage and tubing were removed, and a Signoroni's tourniquet applied for three hours and twenty-seven minutes longer ; in other words, the arterial arrest lasted in all five hours. A shot-bag weighing seven pounds was then secured over the common femoral for fifteen hours longer, when the cure was completed.

The second case,† also one of femoral aneurism was particularly interesting, as an attempt was made to carry out in part the suggestions of Mr. Fergusson, of the Cheltenham Hospital, England. The elastic bandage was dispensed with in the first two trials made one day apart, of ninety and of sixty minutes duration, respectively, and

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* *Wien. Med. Wochenschr.*, June 4, 1876.

† *N. Y. Jour. Med.*, May, 1879.

the circulation of the limb controlled by simply encircling it tightly with two or three turns of rubber tubing. Although the tourniquet was, on the withdrawal of the tubing, applied two and three-quarter hours longer, yet a failure resulted from both trials. A third and successful essay was then made in the same manner as in the first case, and the bandage and tubing kept on two and a half hours, when the ether was left off, a tourniquet tightly applied for two and a half hours more, then a Nicaise tourniquet (a broad elastic bandage going around the limb two or three times) for five hours longer, making thus a total arrest of the blood current through the limb for ten hours without any injury to the parts beyond, except a slight numbness which passed off in the course of the next twenty-four hours. The man went out of the hospital a few days afterward and resumed his work. I may add here, as bearing on the point recently raised by Mr. Puzey, in the *Lancet* of October 18, 1879, as to the permanency of a cure of aneurism by the elastic bandage, that this last patient has within the past week returned to the hospital for the treatment of an aortic aneurism and the remains of his cured femoral aneurism, the size of a large bean, can be felt with the artery pulsating down close to it.

The third and last case, the fatal one, is in detail, as follows:

Popliteal Aneurism. Esmarch's bandage for seven hours and twenty minutes. Collapse. Fatty Heart. Death.

Matthew Miner, a colored man of 38 years of age, of phthisical habit though in good condition, entered the New York Hospital, January 15, 1880, with a large popliteal aneurism of the right leg, which had existed about four months. He attributed the enlargement to an injury incurred by his foot slipping while he was lifting a heavy box. One week after this strain he felt a sharp pain in the right politeal space, and after three weeks of neuralgic twinges in the limb, he noticed a pulsating swelling

in the ham. The tumor was found on his admission to the hospital to be somewhat larger than the closed fist, filling up the popliteal space, pulsating freely and expansively, and with a loud sharp bruit most noticeable at its upper part. The arteries in the groin and at the wrist seemed normal. At 3.45, P. M., the same day Esmarch's elastic bandage was applied, not very snugly, up to the tumor. The patient was then stood erect, and a second elastic bandage carried around the limb above the aneurism to the middle of the thigh, where the rubber tubing was tightly secured. The tubing was left on until 6.20 P. M., *i.e.*, two hours and thirty-five minutes, when it was removed, but not the bandage. A Signoroni's tourniquet was now applied, and retained with the bandage until 8.10 P. M., one hour and fifty minutes longer. This plan was adopted, as it had been noticed in this case as in my first case that the elastic bandage by itself did not control absolutely the current through the aneurism, and also that in my second case Nicaise's tourniquet answered so happily. Moreover, we thought by thus keeping on the bandage, that such firm compression by the tourniquet would not be demanded. The total compression was four hours and twenty-five minutes in duration, with the result of producing a consolidation of the aneurism. The patient was a man of strong will, and declined to take ether, and only received during the treatment a single hypodermic injection of ℔ x of Magendie's solution of morphia. The next day it was found that the pulsation had returned, but the leg was of natural temperature, though somewhat more swollen from the knee to the ankle.

On the 18th inst. the elastic bandage and tubing were applied as before, and retained from 5.20 P. M. to 8.10 P. M. (*i.e.*, for two hours and fifty minutes) when the rubber tubing was removed, and the bandage alone continued, through an error in my directions, an hour longer than was intended, on the limb, until 12.10 A. M., when the bandage was taken off and a Signoroni's tourniquet applied for half an hour longer at the groin. No bruit or pulsation was then to be detected in the aneurism, and the whole leg was cold and insensitive. The time occupied by the compression was in all seven hours and twenty minutes, during six hours and fifty minutes of which time the elastic bandage had been on. The patient had as before borne the pressure so well that only one hypodermic of morphine, gr. ¼, had been given. No ether was used, though ordered if the pain should be severe. His general condition when left for the night, as far as noticed, was good. As

a precautionary measure a seven pound bag of shot was laid over the artery at Poupart's ligament. The next morning, January 19th, when seen at nine o'clock by the house surgeon, the patient stated that he felt all right, only a little weak, but on trying the pulse at the wrist, it was found to be nearly absent, and in the femoral artery it was very weak and irregular. Temp. 101.2°, P. 78. Aside from the pulse, there were at that time no marked evidences of shock. The right leg from just below the knee to the toes was cold, and in the plantar surface of the foot were irregular mottled patches, but not more so than had been observed in my first case. No pulsation was to be detected in the aneurism or tibials, though in the superficial femoral above the aneurism it could be recognized. The patient was also able to move the limb. The whole leg and thigh were immediately enveloped in cotton, and hot air directed under the bedclothes, and whiskey administered, ℥ ss., every half hour by the mouth. At two o'clock in the afternoon the toes and sole of the foot and the upper and posterior part of the leg had become warm, and the area of coldness and duskiness now extended only from the root of the toes dorsally to half way up the leg anteriorly, and embraced nearly the full width of the limb. The patient's general condition had not changed for the better. Pulse at the wrist entirely absent; face bathed in perspiration; T. 99°; P. 58; no anxiety of countenance, nor any mental disturbance. The patient said again he felt all right, with the exception of a slight nausea and sinking sensations.

Hypodermic injections of ether and whiskey were joined to the external exhibition of stimulants, but the patient never rallied, and at 4 A. M., January 20th, a little more than twenty-seven hours after the cessation of the compression, he died.

The autopsy twelve hours later revealed no evidence of change in the tissues of thigh, leg or foot of the affected side, except that the epidermis of the great and two adjacent toes near the nails could be easily detached, and looked as if this had resulted from a burn from the hot air apparatus. Slight serous infiltration and minute capillary hemorrhages were visible, more particularly in the deeper parts of the limb. The right leg measured two and a-half inches larger at the calf than the left, and on the skin above and below the aneurism could be seen a zone of deeper color than elsewhere, and apparently marking the site of the rubber bandages.

The artery and veins from the aorta to the foot were removed and carefully inspected. The veins were normal, and filled with

recently clotted blood. The femoral artery above the aneurism was empty of clot, and above the profunda the coats of the artery were normal; below this point to the aneurism, however, the artery was rough and thickened. Nowhere was there any obvious deposit of atheroma except one small patch in the common iliac. The artery below the tumor was filled to some distance below the bifurcation of the popliteal with a small amount of soft recent clot. The aneurism itself, which sprang from the anterior wall of the artery through an oval opening one and a quarter inches long, was twelve inches in circumference, and was filled with a well-formed recent clot. The anterior crural nerve at the point of pressure of the rubber tubing and tourniquet appeared normal.

Further examination showed advanced fibrous phthisis in both lungs, an atheromatous aorta, and microscopically a distinctly fatty degeneration of the muscular fibres of the heart, more particularly observed in the right than in the left ventricle. The other organs, brain, liver and spleen were normal. The kidneys were intensely congested, but otherwise normal.

So far as is known, this is the first fatal case resulting from the employment of Esmarch's elastic bandage in the treatment of aneurism. A case that was published by Mr. Bryant, of Guy's Hospital, London (*Med. Times and Gaz.*, July 27, 1878), has been quoted as one of gangrene due to this method, but an examination of the report shows that there had been two unsuccessful trials of the elastic bandage for a popliteal aneurism, March 12th and 15th, for two and a half and three hours respectively, and that twelve days after the last trial the artery was ligated in the usual locality. The next day signs of gangrene supervened, and extended from the toes to the ankle. On the 28th day after the ligation the leg was amputated, and it was then found that no vessels required to be tied. The patient recovered.

This case may therefore be set aside as not bearing on the point under consideration at present.

Cases of gangrene from other modes of compression are also exceedingly rare, and in a recent thesis on this subject

by Gancel,* but four cases were collected where the accident had taken place. In all these cases, save one, digital compression had been resorted to, and the examination of the limb obtained, either by reason of death or amputation, showed obliteration of the popliteal at its bifurcation by a clot. This condition associated with an atheromatous and hence undilatable and collateral circulation, Gancel believes to be present in every case of gangrene.

Although the post-mortem examination disclosed no positive signs of gangrene, and hence the cause of death may be assigned to the shock of the prolonged general compression of the limb upon the fatty heart, without the shielding effect of an anæsthetic, yet I cannot but feel that in the desire to speedily cure an aneurism, an undue risk would be run by a repetition of the treatment carried out in this case. Hereafter I should be inclined to adhere to the plan I had at first laid down in the paper alluded to above, and which the experience of my second case led me to depart from. This plan of treatment was to apply the bandage and tubing in such manner as to leave the aneurism exposed for observation, etc., and to keep up the compression for two hours, when the bandage and tubing are to be removed, and a Signoroni's tourniquet resorted to for a period of two hours more, when the tumor is to be examined, at the same time cautiously letting up the tourniquet. If pulsation is still felt, the compression of the tourniquet is to be resumed either in the same place or, preferably, in a new spot. In the event of a change in the site of pressure, an assistant is to carefully control the arterial current while the change of the instrument is being effected. The further continuance of a tourniquet for a period of two hours would, I think, be permissible, though it is most advisable to test the con-

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* E. Gancel. Gangrène du pied et de la jambe à la suite du traitement des anévrysmes par la compression indirecte, 1879.

dition of the aneurism every half hour during the time. After the consolidation of the aneurism is effected, it is desirable to further control, to a certain extent, the circulation for several hours by the application of a shot-bag of a weight of five to seven pounds. Such a mode of procedure would, I think, be a safe one.

A CONTRIBUTION TO THE KNOWLEDGE OF THE PHYSIOLOGICAL PROPERTIES OF SALICYLIC ACID.

By Ass't-Surgeon H. G. BEYER, U. S. Navy.

EVER since Herman Kolbe, of Leipzig, re-discovered salicylic acid by devising a plan for producing it artificially through the action of carbonic acid, on a mixture of caustic soda and carbolic acid, medical men of all countries have subjected this drug to numerous experiments and trials, a fact, with which every reader of medical journals is sufficienty familiar. The great majority of the experiments, however, have had a more or less therapeutical bearing only, the physiological properties of salicylic acid having been left somewhat in the background.

Just about three years ago, while stationed at the U. S. Naval Hospital, Brooklyn, N. Y., when salicylic acid was a comparatively new remedy, and at a time at which large doses of it were still only taken with a certain amount of suspicion, I determined to make some experiments with it on myself and others, with the double object in view of:

First, establishing its relation to the quantities of the excrementitious constituents of the urine.

Secondly, its effects on temperature, pulse and respiration.

I.—Effects of salicylic acid on the quantities of excrementitious principles of the urine.

For this purpose a certain amount of salicylic acid was

taken daily for ten successive days, under conditions as nearly physiological as our present means for procuring such would allow of. The urine, passed during the twenty-four hours, was carefully collected and afterward subjected to quantitative analysis, attention being given to only those urinary constituents which are of immediate importance and practicable in a series of experiments of this kind, namely, urea, the chlorides, phosphates and free acid.

Although physiologists are still far from having arrived at an ultimate certainty in regard to the real practical value of these conditions, called physiological, upon which most of our experiments have to depend, it remains nevertheless a fact, that quantities of excrementitious matter thrown out of the system by the urine, as products of a destructive tissue-metamorphosis, will vary according to the different conditions of the economy.

Therefore, the value of the results of such experiments must naturally, greatly depend on a knowledge and true estimation of the laws governing these changes.

For instance, the quantity of urea excreted by the kidney in a given time, will depend :

1. On the weight of the body experimented upon, and the relative proportions of adipose to other tissues.

2. On the quantity as well as quality of food taken.

3. On the force and rapidity of the flow of the nutritive fluids of the body. These are of immediate importance.

Besides these, there are conditions of minor importance which must not be overlooked. It is, as a rule, larger in men than in women, the greater the amount of urine passed, and also the greater the number of acts of micturition. In reference to the effects of muscular exercise on the amount of urea excreted by the urine, physiologists are still in doubt. A large number of experiments have been made with the view of solving this difficult problem by men of

great eminence such as Lehmann, Speck, Hammond, Genth, Mosler and others, but with results that are diametrically opposed to each other. Fick and Wislicenus, after a long and active exercise, consisting in mounting the Faulhorn, failed to observe an increase of urea. Weigelin, after experimenting on himself, is of the opinion that urea is increased after muscular excercise. Austin Flint, Jr., from his well-known experiments on Mr. Weston, and Alberton Thompson of London, from observations on the same man have arrived at conclusions analogous to those of Weigelin, namely that urea is increased in the urine on muscular exercise. The views of the latter three experimenters are most probably the only correct ones, although the question still remains *sub judice*.

A high atmospheric temperature is supposed to lessen the amount of urea in the urine on account of the skin taking on part of the functions of the kidneys. An exclusively nitrogenous diet, will increase the amount of urea. Mental activity, coffee, tea, chocolate and alcoholics, decrease it by retarding tissue-metamorphosis.

The same laws hold true in regard to the excretion of chloride of sodium, phosphoric acid and the free acid in the urine, other circumstances being equal.

Keeping, then, all these principles strictly in mind, I began my experiments on November 11, 1876, by analysing the urine of each twenty-four hours for a period of five

TABLE No. I.

November.	Amount.	Sp. Gr.	Urea.	Chlorides.	Phosph.	Acid.
11	1125$\frac{00}{}$	1024.	33.187	8.087	2.812	0.438
12	1585$\frac{00}{}$	1015.	30.530	8.743	2.219	0.332
13	1025$\frac{00}{}$	1023.	34.387	8.216	2.289	0.351
14	1488$\frac{00}{}$	1016.	30.477	9.024	1.962	0.414
15	870$\frac{00}{}$	1030.	30.885	8.613	2.320	0.301
Average,	1219^{00}	1021$\frac{2}{3}$.	31.893	8.136	2.320	0.367

days, in order to get the normal daily amount of urea, the chlorides, the phosphates and the free acid. The result of these analyses are exhibited in the foregoing table.

From November 16th, after having ascertained my weight, which was 132 lbs, began to take 30 grains of salicylic acid daily, in divided doses of 10 grains each, for a period of five days, analysing the urine of the 24 hours as before. Table No. II shows the results. Half an hour after the first dose of salicylic acid had been taken, salicylic acid was already discovered to be present in the urine on the addition of a solution of perchloride of iron.

TABLE No. II.

November.	Amount.	Sp. Gr.	Urea.	Chlorides.	Phosph.	Acid.
16	1205^{00}	1025.	37.380	11.810	2.852	0.376
17	1220^{00}	1028.	35.560	14.605	2.625	0.359
18	1060^{00}	1026.	33.920	12.180	2.473	0.349
19	1165^{00}	1024.	36.069	9.594	2.340	0.204
20	1560^{00}	1020.	37.440	10.296	2.860	0.405
Average,	1252^{00}	1024.	36.074	13.607	2.630	0.343

From November 21st to 25th 60 grs. of salicylic acid were taken daily in divided doses of 20 grs. each. The time chosen in this as well as in the preceding series, was half an hour after each meal. The urine of the twenty-four hours was collected and analysed as before. For the results, see Table No. III.

TABLE No. III.

November.	Amount.	Sp. Gr.	Urea.	Chlorides.	Phosph.	Acid.
21	970^{00}	1025.	36.010	9.954	2.486	0.261
22	1800^{00}	1020.	45.000	10.960	3.000	0.198
23	1450^{00}	1024.	46.750	11.890	3.383	0.227
24	1840^{00}	1017.	42.320	13.540	3.337	0.288
25	966^{00}	1028.	34.560	10.872	2.280	0.402
Average,	1405^{00}	1023.	40.934	11.443	3.013	0.275

Salicylic acid disappeared from the urine 38–40 hours after the last dose had been taken. This circumstance is sufficiently indicative of the fact that the system had been thoroughly saturated with the drug. Salicylic acid is, as a rule, easily and speedily absorbed by, and also very promptly and thoroughly eliminated from the system,

In reference to its absorption by the skin, suffice it to say, that I discovered traces of it in the urine after having remained in a bath twenty minutes, in the water of which was dissolved 3 oz. of acid and the temperature of which solution was about 70° F.

By the stomach the acid is, generally, easily born. Persons affected, however, with catarrhal affections of the stomach and intestinal tract are easily nauseated by its administration, as I had frequent occasion to observe later on.

With regard to its elimination, the perspiration, the urine and the fæces have been repeatedly examined. I have never succeeded in finding the slightest trace of salicylic acid in either perspiration or fæces; the kidneys, therefore, appear to be the main, if not the only organs for the elimination of salicylic acid, and the urine is generally laden with it.

It has been calculated that about 67 per cent. of the acid ingested can be thrown out by the urine, the other 35 per cent. are supposed to be destroyed within the organism.

I will add, in reference to the foregoing experiments, that the acid used was imported from Germany (Merck), and that it was taken pure and uncombined with any of the known solvents.

At the end of this series of experiments found my weight was 128 lbs.—4 lbs. less than at the beginning.

II.—*Influence of salicylic acid on temperature, pulse and respiration.*

For this purpose four strong and healthy boys (U. S. Naval apprentices) were selected, each of whom received 100 grains of salicylic acid at 10 A.M. the normal run of their temperature having been ascertained on previous days, their daily average found and placed at the head of table No. IV. The drug was mixed with a little sugar and gum arabic, and given in about half a pint of water. No bad symptoms were complained of except a ringing in the ears, which lasted, according to the statements of three of the boys, from 36–40 hours after the administration of the acid. Boy No. 2 also complained of some nausea, but this probably was due to other causes, for upon inquiry, it was found that his stomach had not been in very good order on the morning of taking the remedy.

In my opinion, salicylic acid, when pure, will not produce nausea, unless the stomach happens to be disordered, irritable or inflamed. After taking a dose of ℥ ii of salicylic acid myself, felt a slight burning sensation in the stomach, reminding one very much of the feeling experienced in heartburn when the stomach is over-acid.

Table No. IV shows the effect of the above-mentioned doses of salicylic acid on the pulse, respiration and temperature of the four boys under observation.

TABLE No. IV.

	I			II			III			IV		
	P.	R.	T.	P.	R.	T.	P.	R.	T.	P.	R.	T.
Phys. norme .	72	20	36.8	74	20	37.	80	18	36.6	76	18	37.
10 A. M. . .	70	20	36.8	76	20	37.2	84	18	36.8	74	18	37.
10.30 " . . .	70	20	36.8	76	20	37.2	80	18	36.3	72	18	36.8
11 " . . .	68	20	36.8	70	20	37.2	72	18	36.2	70	18	36.8
11.30 " . . .	68	20	36.8	64	20	36.8	72	17	36.1	70	18	36.8
12 M. . . .	68	20	36.8	60	20	36.6	70	18	36.6	70	18	36.6
1 P. M. . . .	68	20	36.8	63	22	37.	74	19	36.8	70	18	36.6
2 "	65	20	36.8	74	23	36.8	70	19	36.8	68	18	36.6
3 "	65	20	36.5	76	20	36.8	60	18	36.2	68	18	36.6
4 "	60	19	36.3	64	20	36.6	70	18	36.2	68	18	36.6
5 "	55	18	36.2	64	16	36.6	72	17	36.4	70	18	36.6
6 "	60	20	36.6	64	16	36.6	74	19	36.6	64	17	36.8
9 "	65	19	36.8	68	18	36.6	78	20	36.8	70	18	36.6

In all these cases we find a steady decrease in temperature varying from 0.4° to 0.6° C., or 1–1½° F. Pulse also decreased from 10–15 beats per minute in frequency and respiration, although not very strikingly affected, showed a very decided decrease in Table No. II.

Salicylic acid has been said to compare favorably with quinine in its action in health as well as in disease. The results of these observations enable me to point out several of its physiological characters, and to state in how far and what respect salicylic acid resembles quinine, and in what respect it differs from it, physiologically speaking.

1. In reference to the frequency of the pulse, quinine, according to the researches of Sydney Ringer, when administered in small doses, increase both the frequency and pressure of the pulse, while large doses diminish them; medium doses, often repeated, or one large dose of about 20 grs. taken at once, will diminish the frequency of the pulse by about 12 beats, according to Giacomini, or by 5–7 according to others (Favier, Legroux, Hunt, Mackey).

In this particular, the action of salicylic acid and quinine are about identical. I have had occasion to notice frequently a slight increase in the pulse-rate after the administration of small doses in my patients as well as in experiments on myself. That large doses of salicylic acid produce a decrease in the pulse-rate could be seen from the above experiments.

2. In regard to temperature, find this difference between salicylic acid and quinine, viz.: After the administration of the latter, the temperature sinks under all circumstances, while small doses of the former will first produce a slight elevation in temperature, as was the case during the ten days of experiments on myself, during which time I found my temperature from 0.4 to 0.6° above my physiological

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* See E. Seguin on Medical Thermometry and Human Temperature.

norme.* A fall in the temperature is produced only on the administration of large doses.

3. A most essential difference between quinine and sali cylic acid is elicited by their relative actions upon the quantities of urea in the urine.

Kerner, in experimenting upon himself with quinine, found :

1. Normal urine (average of six days) urea, 18.334.
2. After the continued use of small doses, urea, 16.170.
3. After one very large dose, urea, 13.979.

Showing a very marked decrease in the amount of urea in the urine after the use of quinine.

Salicylic acid, according to the results obtained in my own investigations, gives a very decided increase in the quantity of urea after the administration of large doses, and, consequently, differs most essentially from quinine in this particular.

AN INSTRUMENT FOR MAKING APPLICATIONS OF MEDICATED FLUIDS AND POWDERS TO THE MIDDLE EAR.

By J. A. ANDREWS, M.D., of Clifton, Staten Island, N. Y.

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YORK ; OPHTHALMIC AND AURAL SURGEON TO THE NURSERY AND
CHILD'S HOSPITAL, S. I.

IN the treatment of disease of the middle ear, it is essential to convey the chosen medicament directly to the lining membrane of its cavity.

In those forms of middle ear disease, in which the membrana tympani is imperforate, the practice in general use is to conduct the application to the tympanic cavity through the Eustachian tube by means of the Eustachian catheter. A short time ago Lévi (*Annales des Maladies de L'Oreille, du Pharynx*, etc., tome iv, p. 155) devised a simple method for making applications of medicated vapors to the middle ear through the Eustachian tube, without the aid of the Eustachian catheter. Lévi has modified Roustan's method, and proceeds as follows: The nose-piece, with Politzer's air-bag attached, is inserted, into one nostril ; the alæ nasi are then pressed together so as to exclude all external air. The patient is now directed to close his mouth tightly (hermetically), in such a manner as though he would, with firmly contracted lips, blow into a tube. At this moment Lévi compresses the air-bag in the usual manner. The more the patient blows out the cheeks, the more

readily will the air enter the Eustachian tube. When it is desired to insufflate medicated vapors, the nose-piece 'attached to the different apparatus employed for the generation of the vapors is simply inserted into the nose ; the vapors are condensed in the naso-pharyngeal space, and are then forced into the Eustachian tube, and thence into the middle ear, by the above procedure.*

When perforation of the membrana tympani exists, as in chronic purulent inflammation of the mucous lining of the middle ear, a method very generally resorted to for the purpose of making applications to the tympanic cavity, is one which consists in dropping a medicated fluid into the external auditory meatus. Now, when the perforation in the membrana tympani is large, and extends to the floor of the meatus, the instilled fluid may reach the cavity of the tympanum ; but although the membrana tympani be in this condition of disorganization favorable to the introduction of fluids to its cavity in the above named manner, nevertheless such a procedure is not an efficient one, and must often fail in attaining the desired end.

When, on the other hand, the perforation exists in a part of the membrane at some distance from its lower periphery, *e. g.*, in the centre or in Shrapnell's membrane, and is very small, it is unlikely that a fluid which has simply been dropped into the external meatus, will reach the tympanic cavity. It is, however, much more probable that the instilled fluid will remain at the depth of the canal, lodge against the lower portion of the membrana tympani, and become a source of irritation to a part which it is not our aim to reach ; or what is quite as likely, the fluid runs out of the ear.

* Roosa, of New York (*American Journal of Medical Sciences*, 1866, p. 62) has described a similar method for injecting vapors into the ear ; but he employed Politzer's method of inflation for forcing the vapors into the middle ear.

When the destruction of the membrana tympani has at-
tained a considerable area, I have sometimes found the
following method convenient, and somewhat efficient :
into a broad, round, wedge-shaped nose-piece, with Polit-
zer's air-bag attached, a few drops of the desired solution
are drawn, by means of the air-bag. The nose-piece is then
inserted into the external auditory meatus (which it should
fit closely), and by one or more quick compressions of the
air-bag, the fluid is forced into the middle ear and through
the Eustachian tube. Mr. James Hinton, of London, ad-
vised the forcible syringing of the ear by means of a syringe
whose nozzle was made to fit the external auditory meatus
tightly. It was this procedure that suggested to me the
above method; and Mr. Hinton may have done the same
thing himself. However, although simple, these proced-
ures are perhaps not entirely unobjectionable.

Fig. I. Tube for liquids.

The instrument which it is the object of this paper to de-
scribe consists of a delicately constructed platinum or silver
tube, 11 cm. (5 inches) in length, and 1 mm. ($\frac{1}{25}$ inch) in
diameter, throughout its whole length ; at one extremity
there is a metal knob to receive a small rubber cap (such as
is attached to the ordinary pipette), by means of which
fluid is drawn into the tube, to be afterward ejected into
the middle ear. The tube has, therefore, a diameter about
equal to the smallest hypodermic needle, but is of course
much longer than the latter. For the purpose of removing
mucus or pus from the tympanic cavity, I have had a
larger size made, about No. 4 of the French scale, it being

impossible to suck thick mucus or pus into the very fine tube, unless a great deal of suction force is used, as by the attachment of a hypodermic syringe to the tube.

And here I should mention that Dr. Arthur Hartmann,* and Dr. Clarence J. Black,† of Boston, have described an instrument for cleansing and making applications to the cavity of the tympanum. The latter employs a fine canula attached to an Anel's lachrymal syringe. Dr. Albert H. Buck, of New York, has, I believe, devised a glass tube for the same purpose, whose one extremity is bent at a desired angle. In order to be available, such an instrument must be so very delicately constructed that even in Dr. Buck's skilled hands it would not be entirely free from danger; for having been passed through the perforation in the membrana tympani, the patient, in an ungarded moment, might suddenly draw his head away from the operator, and the delicate hook-shaped extremity break off, fall into the middle ear, and its removal would certainly not be unattended with difficulty.

I have never, as Dr. Blake, employed a syringe in connection with my instrument, for I am convinced from practice with it, that all the force necessary for the ejection of fluids from the tube, can be exerted by means of the simple rubber cap attachment; moreover, the syringe is in your way while you are conducting the tube to a small perforation in the membrane ; again, the force sometimes requisite to drive the piston of the syringe home, might also readily—even in careful hands—push the point of the canula into a part that it is not desirable to injure. I believe that Hartmann's instrument is free from this objection.

The advantage of having the instrument constructed so delicately is, that it enables the operator at once to conduct

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* Ueber die Ausspülung der Trommelhöhle und ihrer Ausbuchtungen, *Deutsche med. Wochenschrift*, p. 571, November 1, 1879.
 † *American Journal of Otology*, January, 1880.

its point to the perforation in the membrana tympani, sup-
posing the former to be very small, and offers as little ob-
stacle to the illumination of the external auditory canal as
would be occasioned by the introduction of a dentist's cot-
ton holder. The rubber cap should be secured to the tube
by winding a fine wire around it just over the notch in the
knob.

For insufflating powders into the middle ear, I employ a
similar tube, No. 5 of French scale, but in the place of the
knob, there is a hollow receiver for the powder, and to
which are attached a piece of fine rubber tubing and a small
air-bag. In the treatment of suppurative inflammation of
the lining of the middle ear, the insufflation of boracic acid
in powder, as recently recommended by Bezold,* certainly
yields very satisfactory results, and, although my experi-
ence with its use, as yet, has been small, still I am forced
to the conclusion that boracic acid is a very useful remedy,
and, as Bezold asserts, should preferably be used in powder.

FIG. II. Tube for powders.—*C* tube, 5ʹ long. *A B* hollow bulb about
actual size. Powder is placed in *A* and the cover *B* screwed on tightly; the
powder is then blown through tube with the mouth, by means of mouth-piece
D. The mouth-piece is used instead of air-bag described in paper.

The mode of employing the instrument is simple. Sup-
pose a case of purulent inflammation of the middle ear,
with a small perforation in the membrane: and it is in just
such a case that our little instrument will be appreciated.
Of course, the first thing to be done, is to thoroughly
cleanse the ear; and too great stress connot be laid upon

* Zur antisceptischen Behandlung des Mittelohreiterung, *Archiv f. Ohren-
heilkunde*, vol. xv, No. 1.

the importance of attention to this point ; indeed, neglect it in purulent inflammation of the middle ear, and you will certainly fail to cure your patients, in a discouraging percentage of cases.

This having been done, a desirable quantity of whatever solution may be chosen is drawn into the tube, and the latter, under good illumination from a mirror upon the forehead, is conducted with care, through an aural speculum placed in the meatus, to the perforation in the membrana tympani, and by a quick compression of the cap, the fluid is injected into the middle ear. Care should be taken not to pass the point of the tube too far beyond the perforation in the membrane ; injury to parts in the middle ear will thus be avoided ; especial care must be observed in this respect, when the membrana tympani is in contact, or nearly so, with the promontory, in which case the end of the tube should be bent at a desirable angle, in order that it may be introduced between the opposed surfaces.

I am confident that many cases of purulent inflammation of the middle ear occur in which the employment of the instrument here described will greatly facilitate the treatment.

About two years ago, I had under my care a gentleman with suppurative inflammation of the middle ear, the membrane having a very small perforation in its upper part. My patient, an intelligent man of means, had seen an aurist in London, who told him that it would, perhaps, take a long time before he could be entirely cured. He remained for fourteen days under the treatment of the London aurist, when business called him unexpectedly to America, and a few days after his arrival, he placed himself under my treatment. He was a very confiding patient ; but, after having treated him during two months with very little benefit, I had begun to despair of being able to cure him. It was at

this juncture that it occurred to me to use the canula of a
fine exploring trocar which I possessed, and in less than five
weeks subsequently, the gentleman passed from my treat-
ment cured of his otorrhœa, and with the perforation in the
membrana healed.   I saw the same gentleman a few weeks
ago, and he assured me that his hearing was good, and that
no discharge had occurred since he had passed from my
treatment, which was about a year and a-half ago.

EDITORIAL DEPARTMENT.

LUNACY REFORM.

III

OUR ASYLUMS AS SEEN BY A COMPETENT FOREIGN VISITOR.

During the past winter a German physician, skilled in the study of nervous and mental diseases, one of Professor Westphal's assistants in the *Charité* at Berlin, visited this country and made a careful inspection of all the asylums within a reasonable distance from New York. Dr. von den Steinen paid particular attention to the two City asylums on the Islands, and the editor of the ARCHIVES requested a statement of his experience.

The following are the editor's letters and Dr. von den Steinen's reply :

New York, Nov. 16, 1879.

DEAR DOCTOR :

In your capacity of expert and impartial observer, you have had an unusual opportunity of judging of the condition of the two City asylums for the insane—the one for females on Blackwell's Island, and the one for males on Ward's Island.

The medical profession in this City and State would, I am sure, be glad to learn your opinion of these institutions.

If you reply, pray do so frankly, as those of us who hope to see an improvement in the treatment of the insane are not afraid to hear the truth, even though it be not flattering.

Very truly yours,

E. C. SEGUIN.

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DEAR DOCTOR :

I would not venture to accept your invitation
had I not visited a number of American institutions for the in-
sane, and found opportunities of forming an opinion in regard to
the present condition of psychiatry in your country.   There is,
however, no claim to impartiality on my part, except in so far as
personal remarks are concerned.   I shall admit that in thorough
discussions with many *confrères*, whose views did not agree with
mine, I had occasion to observe, as I believe, the best intentions
and interest of doing justice to the patients.   In regard to the
subject itself, my judgment is not at all unbiassed ; on the con-
trary, I should like to proceed as radically as possible to ensure
in the American system of treating insanity an improvement in
keeping with modern experience and the assistance so lavishly
bestowed.

A visit to your asylums is of two-fold interest to a German asy-
lum physician ; for what we are beginning to overcome, and the
most difficult part of which—the resistance of the old school—we
have already surmounted, is here still in a most flourishing condi-
tion.   A *confrère* in Utica, of whose humane character I am fully
convinced, even went as far as to assert that the crib was a " hu-
mane " means of restraint.   Conolly has not yet lived for Amer-
ica ; but when a change occurs the asylum physicians will have
let the glory escape them of having introduced the spirit of pro-
gress in their profession.

If most of your institutions are not as good as they might be,
Blackwell's Island and Ward's Island are, I think, in as poor a
condition as they possibly could be.   In October, 1879, I visited
these two asylums, and in January, 1880, also the branch asylum
on Randall's Island.   These visits were necessarily of short dura-
tion, but I fear that a prolonged stay would not have made the
impressions received any more favorable.   Even my views in re-
gard to asylum buildings differ so materially from the system here
employed, that I would probably not leave one stone upon the
other on Blackwell's Island.   I have heard of the new expensive
institutions called " palace prisons," and I must admit that I

believe the name to be appropriate, since it brings to mind both their impracticable and cruel side. If proceeding from the idea that the buildings are for the patients, and not the patients for the buildings, then the two-story structures ought not to be so much neglected, where the inmates might live in the basement, freely move about in the court-yard and garden, and sleep in the second story. To be confined in the third or fourth story, just beneath the roof, to be released only at certain hours, to have the beautiful aspect of the surrounding country before one's eyes all day long—oh, what person in Poughkeepsie, Middletown or Danvers could place himself in the position of a patient without experiencing that it is hardly possible to make the deprivation of liberty, so keenly felt by many, more unbearable ? But it seems as if the idea of providing a hospital for the acute patients and a home for the chronic inmates, had hardly yet occurred to any one ; indeed it would seem as though the sole object were to keep a large number of human beings safely behind lock and key, and that what may be termed modifications of the workhouse and jail, are built for that purpose. Thus the " palace" prison of Blackwell's Island is located in a worthy neighborhood. In the " lodges" the refractory patients live in rooms where a high iron grating, provided with a door, separates a corridor running along the window from the main apartment, and I noticed that patients were kept outside or inside of this grating at the discretion of the nurse. To judge from the result attained, it would seem that the builder had before his mind's eye a menagerie for beasts of prey. In short, the style of building bespeaks the layman who is anxious to protect us from outbreaks of violence, but the physician who treats patients is not to be recognized from it.

So much for the plans of buildings. How is it with the mode of treatment ? I am reminded of a scene I witnessed on Ward's Island. There was a pretty small cell, the window of which was provided with a wire grating and heavy wooden shutters ; in this apartment, which was darkened at night, a patient having his arms in a muff was walking about. I now would ask, why did they not also put a gag into the mouth of this man, who was still able to abuse and scream ?

I observed much during my visit that did not quite meet my approval. On Blackwell's Island I saw two fresh hæmatomas of the ear, and the physician could not tell how they originated ; he was surprised that both occurred on the left ear ; I requested him to question the nurses. In the one case he was fully satisfied when the nurse declared that "she didn't know ;" in the other he accepted as an answer that the patient had got up in the morning with the fresh hæmatoma. Two female patients were running about bare-footed, but not a word was said about it. According to the physician's own assertions, one of them had already been sleeping in the "crib" for eight months ! she had been successful in destroying the lock, and the lid was fastened every night by means of ropes. He showed me the straps and wristlets, of which a minute account was kept. I pointed to a girl who was tied to a chair by means of towels, and he remarked : "But that is not restraint."

I do not wish to cast unnecessary, and perhaps unintentionally, unjust reproaches, for the reply ; "the asylums are crowded and overcrowded," is too true. The figures bear testimony of this. But I may assert that more could be done than is actually accomplished ; for I have witnessed this myself. I visited Blackwell's Island twice. The first time I was shocked at the stupid inactivity to be observed even in the quiet wards, and the question involuntarily forced itself on my mind, "Must not one become demented here if he is not already so ?" What are the patients doing the whole day ? In response to my inquiries, the physician replied : "Well, they are doing the whole day what they are doing now." The second time I came in company with a Commissioner of Charities and Correction. What a different picture now presented itself to us in the three wards ! A large number of patients were diligently sewing, one of the nurses giving them instruction ; in the centre was a small table, upon which were heaped the materials and implements required ; it was a pleasure indeed to behold this sight. I was really astonished at the order prevailing, which seemed to be even greater than that usually to be observed in an apartment where so many busy hands are at work, and the only

way in which I could explain this to myself was that we had ar-
rived at the beginning of working hours, for the seams upon
which they were sewing had in no case reached more than a foot
in length. As they were all busy sewing, it was probably merely
accidental that a large bundle of stockings was lying upon a
chair, and could be triumphantly produced by the nurse to the
Commissioner as a proof of past diligence. It was surely very
wrong in the physician to have told me on the former occasion :
" They are doing the whole day what they are doing now."

I presume that the impression received of Randall's Island in
the same way would have probably been less disconsolate at an-
other time. After passing through the dining-room, which was
furnished with benches, tables and a side-board, we entered a
large hall, where the patients had assembled. On narrow, low
benches, fastened to the walls between each two windows, there
sat closely crowded about a hundred insane persons, the sad pict-
ures of chronic insanity, hopeless wrecks ; the furniture consisted
of two stoves in the centre of the spacious hall and a water reser-
voir in the upper corner. Even Death is inhuman ! During the
past six months only one of these unfortunates had died. And
to him it may have happened as in a case in the Blackwell's Island
reports, that the pathological surgeon has pronounced " exhaust-
ion and dementia " as the " cause of death."

Before an end is put to the overcrowding of the asylums, it is
naturally impossible to think of improvements ; for the patients
could not be kept sufficiently busy, and the number of nurses
requisite not being procurable, non-restraint could not be intro-
duced—even if that were desired. But I believe we have not
much to hope from the present generation of Superintendents,
unless the practical proof were furnished by an asylum in this
country that psychiatry has at present a knowledge of a different
mode of treatment, and is on the point of cultivating it. But how
is a zealous cultivation of scientific interests possible, when the
Association of Superintendents form an exclusive union, into
which those gentlemen are refused admission who *de facto* have
control of the really medical observations and of the treatment in
asylums ?

You will please permit me to offer reasons in support of my unfavorable opinion of the condition of the treatment of insanity in your country. All hinges on the questions of employment, and on the non-restraint system. They run parallel, and constitute, in fact, but one question, although the one more particularly concerns chronic, and the other more freely touches acute cases. The former has already been so discussed, particularly by Wilbur, that I think it unnecessary to dilate on it. There is a lack of confidence in the ability to accomplish that which is accomplished in other places, where easy forms of employment, the requirements of religion and amusement are estimated at their full value. Although idiocy is not everywhere looked upon as being within the province of psychiatry, I still believe that many of those who are pusillanimous in this matter might profit by visiting a well-conducted idiot asylum ; they could there convince themselves how incessant employment is capable of spurring even more wretched minds than those of most chronic imbeciles to performances that could not have been anticipated ; this result being accomplished by uniting energetic exertions with the highest psychiatric art— exact individualizing.

After many discussions, I must decidedly declare that my American *confrères* are not only lacking in courage but also in a proper understanding of the true nature and value of non-restraint.

When I mention the fact that under unfavorable conditions absolutely no restraint is exercised on the considerable number of refractory patients in the *Charité-Krankenhaus* at Berlin, I am always certain of meeting somewhat dubious faces, and invariably receive the answer : " But in our experience we have found that in a certain number of cases " (which, however, are always to be met with) "it is impossible without restraint to prevent patients from injuring either themselves or others, and our apparatus is the best adapted for that purpose." I must frankly confess that, in my opinion, they have no such experience as they believe themselves entitled to claim. The non-restraint system cannot be subjected to many experiments ; it must *either be rejected or accepted ;*

the essence, the nature and secret of it is its unconditional application. The transitory stage at which you stop includes the greatest difficulties; truce is not peace, but war. When you become doubtful of success, you put on the jacket again, but you cannot get along without it until you have none to use. Do not believe that we allow our patients to be abused by the fists of attendants and have their ribs broken; do not suppose that we poison them by substituting chemical restraint, or, as Neumann has ingeniously termed it, "the restraint of the pedunculi;" and, lastly, do not believe—for the contrary would be correct—that the number of suicides is greater than in your asylums; but still we do not require your means of restraint, because we are not in pos· session of them, and because we possess naught but a single jacket that serves to demonstrate to the students the method formerly in practice. But something else is true : when the new system was introduced in the *Charité*, all the attendants, with the exception of one or two, had to be dismissed. Neither physicians nor attendants should know that a system of restraint is in existence. In this point is involved as well the only possibility of solving the task, as the greatest benefit of treatment. The asylum undergoes an entire change. A superintendent of very humane principles told me that he never employed cribs, although they might be of service at times, because if he had one the attendants would demand more. And so it is. Restraint serves to ensure the comfort of the attendants,* while now they are compelled to treat free patients kindly and deferentially to accomplish those results that were formerly obtained by force.

In the better asylums I did not observe any of the cruelties for which they are reproached; but I did notice in all instances that the patients sat downcast in their chairs while the nurse was tending to his private affairs. In no case have I seen a ward for

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* In illustration of the correctness of this statement, I may quote the following, which has been learned on unquestionable authority. An assistant physician in an asylum near New York, (not on the Islands) was asked by a medical visitor if the nurses in the violent wards (where many patients were in restraint, and where the din, etc., was horrible) would not like a temporary transfer to the quiet wards. " O, no," replied the Doctor ; " they prefer to stay where they are ; it's less trouble to take care of violent patient than of convalescents," or words to that effect.—[EDITOR.]

violent cases where the attendants were really intent upon subduing the excitement of the patient by kindly and intelligently adapting themselves to his humor. In at least four asylums I observed patients in bare feet, while neither physicians nor attendants seemed to take notice of that neglect. In a large asylum I found an enormous number of female patients with short-cut and shaven hair, and upon questioning for the reason of this procedure, which at other times stamps the convict, I received the answer " that there would be too much trouble otherwise." Just because the care for the respectable appearance of the patients occasions trouble to the nurses, they should be employed as much as possible in that direction. And there is really no better school for teaching female nurses patience and self-command than the procedure of dressing the hair of weak-minded and violent female patients. It cannot be too often impressed on the minds of attendants that they are dealing with *patients :* this simple truth, which we so fully understand, they are unable to comprehend when these so-called patients are bound. Where physicians are hard of access to the ideas of reform, attendants will fully be so. It is a matter of necessity that the physician live among the patients, and does not scorn to be himself the best nurse.

It is true that in rare exceptions we resort to hydropathic wrapping of the patient, for the most important reason of subduing his excitement, and they say in such rare exceptions we really have restraint. But it is absolutely *not* restraint in the opinion of nurses and patients, for we also employ this mode of hydropathic treatment where such an indication would be utterly false.

How are patients treated who have an inclination to suicide ? The crib or muff is employed, or it is deemed satisfactory if the watchman looks after them every half-hour. Such a guardian is no protection at all, because the patient may accomplish his purpose while he is absent for a moment. We put such patients, with all others who require special care, into a large dormitory, where two nurses, who relieve each other, are on guard all night, and are subject to strict control.

We must admit, free treatment is not possible when the corps of

nurses is deficient in the qualities requisite. Nothing is more lamentable ; for the nurses constitute a part of the therapeutic appliances of the asylums, as bandages form part of the therapeutics of the surgical hospital. But there is a number of institutions where this fault has not to be overcome, and where restraint is nevertheless retained. If it is adhered to in asylums like that at Bloomingdale and in the Butler Hospital, Providence, it must, in my opinion, be ascribed to either a lack of knowledge or courage. I am told, "we have but little ;" but even this little is a great deal too much. In stopping midway, by declaring the transitory stage as permanent, there is probably no less trouble occasioned than by introducing an energetic change.

"*Player :* I hope we have reformed that indifferently with us.
"*Hamlet :* O, reform it altogether."

There may be cases where it would be indifferent from the standpoint of humanity whether weak and violent patients were secured or not ; but I cannot emphasize too strongly that the value of strict non-restraint will be experienced from the wholesome influence it exerts on the hospital in general, and that even the few cases of restraint existing should be abolished ; two discordant notes will spoil the effect of an entire piece of music.

Free treatment is the only means of ensuring real medical observation and of transforming the institute of detention into a hospital.

The principal evil which at present checks the development of psychiatry in the United States, is, I believe, more deeply rooted at a point which is well known, but which, being obscured by too many personal remarks, can never be viewed in its true form. If I had not been aware of the fact I should hardly become cognizant of it here, that psychiatry has gradually developed into a respectable science, which, like all sciences, must be taught and learned. As in Germany, so it seems necessary here, to prove that a knowledge of the various forms of mental debility should be obligatory in the education of the physician. When does the general practitioner diagnosticate mental debility ? I am inclined

to believe that he does it very often after the family have made the diagnosis and the patient is in such a state that his immediate transfer to an asylum becomes imperative. But the many cases of beginning melancholia and hypochondria, the timely treatment of which would ensure gratifying results ; the interesting group of which we call "Zwangvorstellungen," which are almost solely confined to private practice ; the minor forms of "circular mania ; " who traces them ? Who would be able by timely intervention in the first stage of general paralysis, before the patient has accomplished a thousand fatal deeds, to make a diagnosis before motor troubles appear ? And must not the student renounce the greatest advantage which psychiatry offers, and which, like no other branch of medicine, teaches him to fully understand the humane duty of his calling—which shows him not only the diseased organ but also the diseased human being, and places him on so elevated a standpoint that the actions of the mental faculty appear to him as being introduced into the circle of lawful, natural phenomena ?

I now turn to the asylum physicians. A physician who knows nothing of psychiatry is entrusted with the treatment of patients, and great responsibility devolves upon him ; he becomes second assistant, first assistant, and will eventually be superintendent, if fortune and influential connections favor him. The superintendent is fully taken up by administrative duties, and has not the opportunity of instructing his assistants, and letting them profit by his practical experience. Nowadays no trade is learned autodidactically, much less a science. Or are *Griesingers* more frequent in this country, who after studying mental diseases for two years are able to write a work of great merit on them ? Without sufficient education, neither pathological nor clinical results can be attained. Since the neglect of pathology is frankly admitted in all asylums, and as Utica takes an almost isolated position in the interest it shows for these problems, I will simply speak of clinical knowledge, although this can hardly exist without pathology. I do not wish to criticize the reports which often give proof of very confused ideas in regard to the classification of mental diseases ;

but I was often astonished in passing from the classification of the apartments to that of their inmates to come across—I cannot otherwise express it—real ignorance. Even a layman is able to term a raving person as maniacal, one who refuses aliment as melancholic, and will soon learn that a demented patient who cannot utter an articulated word, and from whose trousers the urine is dripping, must be designated as paralytic; but of the physician we might expect a scientific analysis and classification of the cases. How nonsensical to term all mental derangements *ex puerperis* " puerperal *mania*." I am well justified in uttering reproaches when I find that even so plain a disease as general paralysis is so insufficiently known, as I have constantly had occasion to observe. I wish to know the number of paralytics, and after a hasty visit I ascertain as many more than have been reported. General paralysis of the female, which is of comparatively rare occurrence with us also, was said to be found hardly anywhere ; but in each of three asylums I was able to point out a typical case while passing through the wards in company with the physicians, whom I envied for having them.

I must necessarily suppose that these conditions are worse than I can determine. Without classification there is no prognosis ; and the judgment in regard to the possibility of discharge cannot be base on scientific grounds.

I presume that my implications are fully understood. I know that there is in existence something like psychiatrical instruction. That may be better than nothing ; but the students will learn no more of psychiatry than I know of astronomy (being able to tell the names of a few constellations, and knowing a few astronomical laws), they will never acquire practical experience and independent judgment unless they have seen and examined a number of insane persons.

I believe the reformation of the asylums will be attended with lasting results only when the essential desideratum is expressed as follows :

Asylums for curable lunatics and for clinical instruction—clinical hospitals for psychiatry as well as for every other medical specialty.

Such cases as are pronounced incurable to be transferred to asylums for chronic patients. From the experiments about to be made in Germany, it would seem that the following are the principal points :

A two-story building with a few acres of land around it, connecting with a general hospital, and being able to receive not more than 80–100 patients who are presumably curable. For new patients and such others as require special care, a large dormitory is suggested ; many separate apartments ; isolating cells of superior construction ; as many bathing-rooms as possible. The superintendent to be a professor, with at least four assistants, appointed for a term of two years ; liberal allotments of space and apparatus for utilizing the clinical and pathological material ; one head nurse for the male and female sections respectively ; the proportion of the other nurses not to be less than one for three patients.

The advantages to be afforded and attained by an institution of this kind consist in the cultivation of science and a rational system of medical treatment. The results will be these : The practical physician will gain a knowledge of psychiatry ; the interest of those concerned is awakened, and an opportunity of training for asylum practice is afforded ; competent nurses are educated ; finally, a station for the examination of medico-legal cases is established.

These institutions are undoubtedly expensive, but they are an urgent necessity, and the time will come when the people who are now so liberally contributing money to the care of the insane, will learn to expend it in the right direction.

NEW BOOKS AND INSTRUMENTS.

The Pathology and Treatment of Venereal Diseases. By FREEMAN J. BUMSTEAD, M.D., LL.D., late Professor of Venereal Diseases, etc., etc. Fourth edition, revised, enlarged, and in great part rewritten by the author, and by Robert W. Taylor, A.M., M.D., Professor of Skin diseases in the University of Vermont, etc., etc. Philadelphia, Henry C. Lea, 1879, pp. 835.

We presume that every reader of the ARCHIVES is already the possessor of some previous edition of this work. If not, and he has any desire to become acquainted with this department of his profession, we can only advise him to buy the new edition at once, for it is, without exception, the most valuable single work on all branches of the subject of which it treats, in any language. The pathology is sound, the work is at the same time in the highest degree practical, and the hints that he will get from it for the management of any one case, at all obscure or obstinate, will more than repay him for the outlay.

But many who already have in their libraries the third edition, published in 1879, and are well aware of its value, will be in doubt whether it is worth their while to purchase the new edition. There is much less difference between the first and third editions than between the third and fourth. Indeed, this edition contains nearly one-third new matter, although the size of the volume is not much greater than before, on account of the use of smaller type and the omission of considerable discussion of issues which have now either been settled or lost their interest. Still this edition contains over one hundred and twenty pages more than the last.

Much of this new matter must be from the pen of Dr. Taylor, but, instead of breaking the original text by the introduction of brackets or notes of any kind, each subject is treated of connectedly, and the paragraphs read so smoothly that it would be very difficult, if not impossible, to detect that more than one writer was engaged upon the work.

The number of illustrations has been increased from sixty-two in the third edition to one hundred and thirty-eight in this, many of the new ones being of really great value, while some of the old ones have been omitted altogether or replaced by new and better ones.

The chapter on the affections of the eye has been wholly re-written and much new matter introduced, notably new sections on affections of the sclera, of the ciliary body, of the optic nerve and of the vitreous, and on paralysis of the nerves of the eye. Dr. Loring's reputation is sufficient guarantee that the work has been faithfully and ably performed.

It is a noticeable feature of the book that the authors have expressed a positive opinion, with their reasons therefor, on every point which has of late years been the subject of dispute among specialists in this department, while they have at the same time avoided any vain-glorious boasting over their superior genius, or the marvellous success of their treatment. The tone of the work is, in other words, one which necessarily begets confidence, while all show of personal feeling is carefully avoided. One paragraph from page 264 will illustrate the point. " Prof. Otis believes that a spasmodic stricture due to reflex irritation may exist continuously for years, even fifteen or twenty years, during which time it is nearly or wholly impassable to any instrument, although at any moment it may be made to entirely disappear by the removal of the source of irritation. He says : ' Deep organic urethral stricture is often simulated by muscular spasm, the result of irritation caused by slight anterior strictures, even by a slight contraction of the meatus urinarius alone. *The great proportion of cases treated by gradual dilatation are treated for deep stricture which does not exist.*' (The italics are in the original.) So far as I know, such long-continued spasm is never met with in other muscular tissues. Moreover, I believe that any spasmodic stricture can be passed with patience and suitable instruments, and until I meet with a case of the kind described by Dr. Otis, as I never yet have done, I cannot admit of spasm lasting through years."

While speaking, farther on, about internal urethrotomy, after

complimenting Dr. Otis' dilating urethrotome—and an excellent instrument it is—we read of the operation that " it requires an amount of care, skill and experience not possessed by every prac- titioner of medicine or every man calling himself a surgeon." After quoting unpleasant results which had occurred to others, and frankly admitting to have lost two patients himself from septicæmia, Dr. Bumstead says : " In view of the above con- siderations, the surgeon may well avoid internal urethrotomy, unless decidedly called for, and when other means are unavail- able. Knowing what I do of the operation, if I had a marked and annoying stricture in the anterior portion of the urethra, or if I had an obstinate gleet which no other means would relieve, or if I were the subject of one of those tormenting neuralgias, de- pendent upon stricture, *that we read of*, I would have my stricture cut ; but if I had only a 'stricture of large calibre,' presenting no obstruction to the urine and occasioning no inconvenience, no argument drawn from possible ills in the future could persuade me to be subjected to the knife, and—*what a surgeon would not have done to himself he has no right to recommend to others !*" In these days such conservative advice may not come amiss.

The new material embraced in this new edition we consider well worth the price of the book. [s. b. w.]

Paracentesis of the Pericardium. A Consideration of the Surgical Treatment of Pericardial Effusions. By JOHN B. ROBERTS, A.M., M.D., Lecturer on Anatomy in the Philadelphia School of Anatomy, etc. With Illustrations. Philadelphia, J. B. Lippincott & Co., pp. 100, 1880.

This unique monograph—unique because, so far as we are aware, it is the first attempt to treat the subject of paracentesis in pericardial effusions with the fullness demanded by the importance of the operation—deserves a cordial welcome. It will at once take rank as an authority. The literature of the subject, hitherto, is comparatively scanty, and is confined to journal articles and descriptions of the operation, more or less incomplete in text-books of medicine. The author has collected sixty cases in which the operation has been performed—a number sufficient to allow relia- ble conclusions—and offers in the present treatise his deductions from an analysis of the material. It would be interesting to fol- low him at some length in his discussion of the various problems involved in the operation, but space will permit us only to indi- cate his suggestions for obviating the chief dangers of the opera-

tion. The dangers to be encountered, besides the comparatively unimportant wounding of the pleura or diaphragm, are puncture of the heart itself and hemorrhage from the internal mammary artery or the branch which traverses the internal surface of the fossa between the ensiform appendix and the seventh cartilage. The former risk may be guarded against by using either Fitch's dome-shaped trocar, in which a blunt or "round-ended" fenestrated canula slides within the needle, or an aspirating trocar devised by Roberts himself. This instrument "consists of a small, needle-pointed cylinder, within which slides, on Fitch's principle, a canula attached to the air-pump. The canula at the end is made flexible by a spiral, and when it is thrust out beyond the end of the needle, curves downward ; but when it is pulled backward the end becomes straight and is entirely concealed with the puncting needle." In operating with this instrument the canula is withdrawn until its flexible end is hidden and the aspirator is attached to a tube, which projects at a right angle from the posterior externity of the canula. Aspiration is begun immediately after puncture of the integument in order to show whether the instrument has entered the pericardium. The needle is withdrawn a little and the canula is thrust into the sac, where it hangs as a blunt flexible tube, which is not only innocuous to the heart but allows suction to be exerted at the very bottom of the pericardial cavity. If this inner tube become plugged with flakes of lymph, it can be withdrawn and the outer one used as a large aspirating needle. We have had no practical experience with this instrument, but it seems to us admirably adopted to obviate one of the chief dangers of the operation.

As regards the most eligible site of operation, Roberts prefers, in most cases, the fifth space from two to two and a quarter inches to the left of the median line of the sternum. This point has the following advantages : It diminishes the danger of wounding the internal mammary artery or the branch previously referred to, or of penetrating the auricle—an accident more dangerous than puncturing the ventricles ; it lessons the risk of injuring the diaphragm or of entering the lung instead of the pericardium, and finally it prevents plugging of the instrument with a disk of cartilage, as happens sometimes in operations nearer the sternum. On the other hand this puncture involves the danger of wounding the pleura, but Roberts regards this contra-indication as much less serious than those mentioned above.

The questions involved in the operation are, however, too nu-

merous and complicated to be discussed here, and we can only commend the reader—whether a physician or surgeon, for the operation may fall to the lot of either—to carefully study for himself the problems presented. There are a few blemishes in style which the author should correct in a new edition. For instance, on page 37 the author says that his "instincts" would lead him to a certain course of treatment. In these days we have no doubt the reader would prefer the author's deliberate judgement on the matter to an unreasoning impulse, whether transmitted through however many generations, or acquired by unconscious absorption, as it were, from the medical atmosphere about him. Still this is a minor criticism, and is not intended to lessen our cordial appreciation of the service he has rendered. If the author will accept a final suggestion he will add to the value of a second edition by giving us a full bibliography on the subject.

[A. B. B.]

A Glance at the Past and Present Condition of the Insane. By A. M. SHEW, M.D. Extract from the Fourteenth Annual Report of the Connnecticut Hospital for the Insane, for the year 1879.

This little pamphlet of six pages deserves notice, only because it is a type of the kind of statement, the mode of reasoning and the self-satisfaction, that appear in some forty or fifty, more or less, of the reports of the medical superintents of as many different state asylums for the insane, in the several states of the Union.

The motive that prompts their resembling utterances, one and all, is well stated in the very first sentence of the one before us. The doctor truly observes :—" It is evident to the most casual observer that the public are not wholly satisfied with the present condition of the insane."

The whole paper is so short, and the greater portion indifferent to criticism, that it may be well to make a running commentary on each sentence of the first page, in order. Following the first sentence, above quoted, we read : " The objectors assert with reason that it is unjust to provide good accommodations for a part, while as many more equally worthy are languishing in almshouses."

That is not the way that the objectors—as he terms them— usually put it. They have commonly contented themselves with saying, that it was unwise and in violation of obvious principles of social science, for any state to provide luxurious accommoda-

tions and costly maintenance for a small part of its insane popula-
tion, while a much larger number were left to languish in alms-
houses, because of this undue expenditure for the few. For there
is a limit to the extent to which any community will tax itself for
the benefit of a single one of its dependent classes.

Again : "Some people would abolish asylums and let each .
family provide as best they could for their afflicted members."
We have never met such people, if by asylums, here, is meant in-
sane asylums. The most narrow-minded members of the social
body must admit that self-protection requires asylums for a certain
portion of the insane.

Again : "Others advocate a system of cottages, pavilions, or
colonies like Gheel, or the promiscuous boarding-out of insane
people, overlooking the fact that all these supplemental plans have
been tried, have proved more or less useful as auxiliary measures, but
have failed to meet the great requirements of governmental sys-
tems." At the outset, it may be observed, that a system of cot-
tages has never been advocated, except in connection with some
central administration building. In such connection, it has not
only been advocated but tried with success.

In an early stage of the administration of Dr. Shew at the
Middletown asylum he adopted this "cottage system" to a certain
extent, and commended it, in one of his annual reports, in quite
glowing language. But the voice of the American Association of
Superintendents of Insane Asylums, in opposition to the system,
was too much for him and he surrendered.

On the other hand, Dr. Bucke, Medical Superintendent of the
London Asylum, in Canada, in a report just published, for the
year 1879, uses the following language : "Nothing has hap-
pened in the year just closed to make me alter what I said in my
last report in praise of our group of cottages. The one hundred
and eighty patients in this part of the Asylum, in spite of the
large amount of liberty they are allowed, give no trouble. We
have still had no elopements from any of the cottages, and no ac-
cident of any kind as the result of too much freedom. The cost
of construction of these buildings was $278 per patient ; and the
cost of maintenance in them is less than it is in any large asylum,
because a much smaller staff of attendants is needed. When the
saving of money and the extra comfort and healthfulness of the
patients is considered, it seems surprising that this system is not
adopted in other countries ; and probably it will be after it has
become known more extensively."

Next as to the point relating to the pavilion system ; by which is meant a series of buildings, connected or otherwise, in distinction from the compact asylum building, with continuous wings, almost universally adopted in the United States.

Certainly some of the most thoughtful men in the specialty are coming to cherish opinions not unlike those of Dr. Clouston, of Edinburgh. He has lately prepared an elaborate plan, for the Mass. Board of Health, which embodies the views of an experienced alienist of acknowledged ability. From the considerations offered in support of his plan I select a single paragraph, that it may be seen whether a system of pavilions must necessarily fail to meet the needs of a governmental system : " It should be remembered, in constructing and furnishing an asylum, that the chief things of which insane patients treated in asylums complain are : *a.* Removal from home. *b.* Being ' locked up.' *c.* Want of employment for which they are paid, and in which they take an interest. *d.* Control by attendants. *e.* Monotony of life. *f.* Association with ' lunatics,' meaning thereby fellow-patients worse in some respects than they are. It follows that in constructing and furnishing the buildings of an asylum, and arranging its various parts, great care should be taken to provide for liberty, domesticity, classification, employment, amusement, and social intercourse between those who will enjoy it. Opportunities must be given for the creation of an artificial home-life, as nearly like the natural as is possible." And again : " Variety in the shape, size and aspect of buildings and rooms, tends to interest, rouse and cheer the patients, when they pass from one to the other."

Compare this suggested and suggestive plan with the wearisome sameness of the typical American asylum—wings stretching to right and left, ward over ward, each the very counterpart of the other ; a long, narrow hall, with uniform and cell-shaped rooms on each side ; wards, where the patients live and eat and sleep, and try to while away the idle and lingering hours by gazing through barred windows at that outer world, " so near and yet so far."

Now, as to colonies like Gheel. Of this Gheel, much has been written, and so far as I know, there has been a general unity of opinion among English-speaking alienists. It is the growth of centuries. It has done a good work in the past, and is still meeting a public need. But it would be hard to cite any writer who has ever proposed to establish its counterpart in any other country. The obvious reason is, that such a mode of managing a large

body of insane men and women, that is, by distributing them among the families of a whole community, could only be developed from small beginnings in a long course of years, during which the families and the local authorities could be gradually educated to their respective duties.

Finally, "the promiscuous boarding out of insane people," that Dr. Shew asserts has been advocated. Who ever heard of such a proposition ? It may possibly be answered that such opinions were imputed to the late Dr. Howe.

He was for years a trustee of an insane asylum in Massachusetts. He was familiar, by frequent travel, with the methods of management of the insane both in this country and in Europe. Furthermore, by long service in the Board of State Charities, he was familiar with the workings of a great variety of public institutions. As the result of his experience, he had come to the belief that all aggregations of, or institutions for the dependent classes, were in the nature of "necessary evils," to be justified only on the ground of their necessity for the protection of society, and so on. He had also satisfied himself that the apparent enormous increase in the number of the insane was, mainly, a mere ingathering of cases, hitherto cared for in families.

The extension of the asylum system was an invitation to everybody to relieve themselves of the burden of insane relatives and friends and turn them over to the care of the state. And this was incidentally weakening the family tie, which all social scientists deprecate. He did, therefore, once suggest that these harmless chronic insane should be put back under the care of families, the state contributing something toward the cost of their maintenance, so as not to cripple the industrial energies of such caretakers as were in indigent circumstances. However, Dr. Howe never pressed his views upon his associates, content with the mere expression of his individual opinions.

Let us quote from Dr. Shew once more. "And still others have gone to the extreme of asserting that we are all insane, or that no one is insane, and that it is unjust to deprive any one of his liberty for this cause. These persons talk loudly about the abuses of asylums, and would place the officers on a par with the criminal keepers of old Bedlam in the sixteenth century. Disagreeable as it may be for conscientious Christian workers in this humane field to remain quiet under such unjust accusations, I am not sure that it is on the whole an evil ; for it stimulates all to the best endeavors, aud throws around the insane every necessary safe guard."

Of this extract, it may be remarked, first,—That the imbeciles, if any such there be, who answer to the description of the first portion, should be forgiven, if they have failed to comprehend the eminent Christian philanthropy of the American superintendents of insane asylums, in view of the possible good results of their clamor, suggested in the latter portion.

Second,—The whole extract, together with what preceeds it, is characteristic of the kind of representation that emanates from our insane asylums, when any question is raised as to the wisdom of their management. On the one hand, according to their statements, are a set of ignorant, inexperienced and visionary enthusiasts, or a class influenced by personal motives either of interest or malice. On the other hand, a band of intelligent and experienced, honest and practical, conscientious, pains-taking and unselfish Christian philanthropists. By such statements, constantly reiterated, they hope to drive from the field of controversy, those who simply ask that experiments, in the way of management and treatment of the insane, may be tried in this country, which have proved eminently successful in other countries.

Then follows what purports to be a brief history of the insane and their treatment from the earliest times till the present century. It is a pathetic story, by whoever told. It illustrates, in its worst features, not so much the inhumanity of those entrusted with the care of the insane as their utter misconception of the real nature of insanity. They were not so much to blame, because there were none to enlighten them as to a kindlier and a better way. But what will posterity say in regard to American alienists of the present generation, who persist in the free use of the most galling physical treatment, the constant presence of appliances that prompt to violence and efforts to escape, and an enforced idleness that breeds not only discontent but wrong-doing. And all this in the face of the principles and practices that prevail not only in Great Britain but even in the neighboring Province of Canada.

This history is but another illustration of the truth that reforms more slowly. It was nearly forty years after Pinel had stricken the fetters from the madmen in the Bicêtre Hospital and brought them out from the domain of brute force and within the humanising reach of moral influences, before any general public efforts, in behalf of the insane, were adopted in Great Britain. And here again is an illustration of the truth that history repeats itself. For among the instances of neglect and abuse that roused the British nation to this great reform, the crowning grievance was the fact that the insane were shut up in what were called cage-bedsteads.

The influence of French example was seen a little more promptly in America than in Great Britain. A public policy of properly caring for the insane, however, was inaugurated almost simultaneously in the two countries during the period from 1820 to 1830.

It may be conceded, as Dr. Shew relates, that up to 1840 our hospitals for the insane compared favorably with those of the mother country. But how is it now? That is the practical question of to-day. And it is not answering this question, to quote from Dr. Arthur Mitchell, language used in 1837, or from Dr. Jarvis, writing in 1841. Nor is it meeting the public distrust as to the present condition of the insane in this country. But that is all the answer he attempts, except the following general statement of his own individual opinion :

"Careful inspection of the best hospitals in England and a few in Germany and France has convinced the writer that the construction, organization and general management at hospitals in the United States compare favorably with the best in Europe."

Not so thought Dr. Bucknill, of England. Witness his "Notes on Asylums in America." He is certainly a competent critic, and the hospitality he received at the hands of the American superintendents during an extensive tour in this country in 1875, imparted a kindly tone to the strictures he was constrained to make of our modes of managing the insane.

But we will go a little more into detail. We have had equal opportunities with Dr. Shew of comparing the methods of management of the insane in this country and in Europe. As a result of such observation, we assert that while in costliness of structures, in heating apparatus and water supply and in appliances for convenience of administration, we are in advance of Great Britain, yet here our superiority ends.

On the other hand in the mode of organization, both in relation to the medical treatment and the economies, in the wise adjustment of buildings and arrangements to suit the varying phases of insanity, and every stage of the disease between acute mania and convalescence ; in the disuse of restraining apparatus, straightjackets, muffs, camisoles and cribs ; in the absence or limited use of the other and perhaps more irritating appliances of restraint, namely, spring-locks, barred windows and immovable seats against the walls ; in the extent to which employment of patients is carried, not only in out-door occupations but in work-shops ; in the diminished use of stimulants and soporifics ; in the degree of

freedom allowed patients ; in the exposure and summary punishment of the neglect or abuse at the hands of attendants ; in the mode of selection of medical officers ; and, finally, in the inspiring influence of the devotion of the medical superintendent to his proper medical duties, seen in the thorough clinical and pathological work done. In all these essentials in good management of the insane and advancement of medical science we are far behind.

Now this is not saying that great neglect or gross abuse exist in our insane asylums as compared with those of Great Britain, but only that there is a wide difference in matters essential to the recovery and well-being of the patients.

If any one doubts this let him candidly examine the report on "Disease of the Mind," made by Dr. Folsom, Secretary of the Massachusetts Board of Health, in 1876. Furthermore, during the twenty-five years prior to 1876, there had been a positive retrogression in the asylums of the United States in those very matters which are now regarded in Great Britain as tests of good management. Since the date named there has been some improvement in our asylums, thanks to the very persons whom Dr. Shew stigmatizes,

It ought to be said in justice to him, personally, that he has been working toward the non-restraint system ; that is to say, he has introduced some military exercises and some employment for patients that have tended to diminish the necessity for the use of restraining apparatus. This is also true of some others among the American superintendents. I ought to mention a single name in this connection ; that of Dr. McDonald, late of the asylum for insane convicts at Auburn. With the worst class of patients in the country he carried the principles of non-restraint, perhaps, to a larger degree than any of his brethren.

But take the half-dozen institutions in the United States that have the best reputation ; the best according to the American notion ; with the finest structures, the most perfect appliances for convenience of administration ; the best organization ; that is to say, with every portion of the establishment from the office desk to the boundary wall, subject to personal direction and control of the medical superintendent ; every official and employee the creature of his choice and the subject of his will. Take such, and we say that in one and all of them you may look for the lowest ratio of recoveries among the patients and the least reference to their comfort and well-being. They are very perfect machines, but they do not do the work they were designed to do.

Starting forty years ago on the same level, it may be asked whence the difference in the present condition of management of the insane in the two countries. It is easily answered. The clue to the answer is contained in the following sentence, by one of the oldest of American superintendents : " I regard it as one of the felicities of our situation that we are exempt from Lunacy Commissioners and that thereby our hospital men are left free to work out the problem of restraint as well as all others connected with hospital management without asking permission from outside authorities." This states the real fact. In the United States the whole policy of dealing with the insane, in all their relations, has been left almost exclusively to the superintendents of hospitals and asylums. On the other hand, in Great Britain, there has been a thorough governmental supervision over such institutions at the hands of efficient Boards of Lunacy. These, by their thorough system of visitation and by their annual reports, have proved a constant incentive to all connected with such institutions to do their utmost to elevate the standard of management. And it is precisely this thorough state supervision that is needed in this country to produce the same effects. We commend it also to Dr. Shew and his brethren in the specialty as a remedy for that public distrust of asylums which they deprecate. This wide-spread dissatisfaction will not be allayed till our communities are made to see that the officers of all such institutions desire efficient supervision and court investigation into their modes of manangement, even when such investigations are prompted by personal enemies or from improper motives.

There is one other point suggested by the paper under review of general interest to the profession. They are not without responsibility in this matter of the proper treatment of the insane in asylums. They have too long neglected their duty in this respect. Too commonly they have not familiarized themselves with the professional aspects of the disease or its mode of treatment. When called to such cases they have been content to rid themselves of what they regarded as troublesome patients, and then consigned them over, without much consideration, to the specialists in an asylum. But more enlarged professional views will have an auxiliary influence in raising the standard of treatment in our insane hospitals.   [H. B.W.]

A Manual of Pathological Histology. By V. CORNIL and L. RANVIER. Translated with notes and additions, by E. O.

SHAKESPEARE, A.M., M.D.; and J. HENRY C. SIMES, M.D.
With 300 illustrations on wood.   Henry C. Lea, Philadelphia,
1880, pp. xxxi, 784.

The original of this work which appeared in parts between
1869 and 1876, has been well and favorably known to all students
of pathology, and its translation is an opportune and desirable
undertaking.

Its authors are men in middle life who have been prominent
for more than ten years in that active group of clinical and patho-
logical workers who have done so much to restore to France the
position she formerly held in medical science.   Both are well
known as original workers in pathology, and Ranvier, in par-
ticular, has gained a wide reputation.   Their book is not a col-
lection of the work of others, but has been written in the labo-
ratory beside the microscope.   It bears the marks of personal
knowledge and investigation upon every page, controlled by and
controlling the work of others.   It is, we think, in no way inferior
to Rindfleisch's book upon the same subject, and in some respects
it is superior, for it carries the study further by going beyond the
limits of histology and embracing a larger amount of gross pathol-
ogy.   The basis of arrangement is not so much *processes* as *systems
and organs*, and the sections devoted to the different subjects con-
tain an account of all the morbid processes observed in each.
This fulness and arrangement make reference easy and satisfac-
tory.   In short, its translation has made it the best work in pathol-
ogy obtainable in our language, one that every student, certainly,
ought to have.

Drs. Shakespeare and Simes have sought to do more than make
a simple translation.   They have edited the work, cutting out,
condensing, and making such additions as were rendered necessa-
ry to the advance in knowledge.   The condensation, including all
additions, amounts to about a quarter of the original work, and
has been judiciously done.   It is, of course, a desirable act in the
interests of economy and a wider circulation, but gives some cause
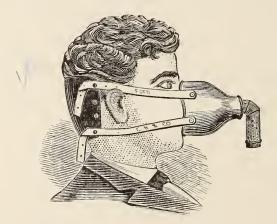for regret by making the style more didactic and less fluent and
personal.

As the original was published in parts during a period of six or
seven years, the authors' views naturally changed upon some sub-
jects, and this had led the translators to attempt to harmonize
conflicting statements by altering the earlier ones to make them
correspond to the latter.   In the only example we have examined
(the anatomy of the lymphatic glands, pages 24 and 350) this has

not been done with complete success ; the conflicting statements remain and the authors' retraction of one of them is omitted.

The translation has been well made, and the language is clear, concise and correct ; but we note in two places—on page 120— what is apparently a misuse of *lay* for *lie*. The number of the illustrations has been reduced from 379 to 360, and many excellent ones, some original and some borrowed, have been substituted for those of the original work.   [L. A. S.]

A Respirator-Inhaler. In the *Medical Times and Gazette*, Nov. 15, 1879, a notice was given of the Respirator-Inhaler of Dr. H. CURSCHMANN, late of Berlin, which had recently been figured in the *Berliner Klinische Wochenschrift*, No. 29, page 430. In the same article reference was made to an apparatus for the same purpose devised by Dr. W. ROBERTS, of Manchester, and which had been described by him some two or three years ago. This apparatus shows " the practicability of a continuous method of inhalation." It can be worn for a few hours or for longer time.

The accompanying cut represents a respirator which I have recently devised. It consists of a soft rubber mask covering the nose and mouth, attached to this is a perforated tin box in which is placed cotton or a fine sponge saturated with a solution of thymol, carbolic acid or creosote. The box is perforated with a number of small holes to allow the free passage of air. The mask and box are kept applied to the face by means of rubber straps passing from the mask to a hard rubber plate which fits the occiput and nape of the neck. The elastic rubber straps permits of the apparatus being lifted forward and upward from the face when the patient desires to expectorate. This can be worn con-

tinuously, even during the night. The patient soon becomes accustomed to wearing it and its weight is not great. Curschmann states that he has used strong solutions of creosote, thymol and carbolic acid, and has never observed any symptoms of poisoning. The results obtained by Dr. C. in the treatment of putrid bronchitis and several cases of phthisis are mentioned as really wonderful. I have not yet had sufficient experience to offer any contribution as to the merits of the apparatus. It has seemed to me as worthy of a trial and its application may be so extended that I have thought that the attention of the profession should be directed to it. [T. A. McB.]

ABSTRACTS AND SUMMARIES.

Chlor-Hydrate of Pilocarpine in Ocular Therapeutics.

CHALOT, (*Gaz. Méd. de Paris*), in a communication to the French Association for the Advancement of Science, in speaking of hypodermic injections of chlor-hyd. of pilocarpine after cataract extractions and in some other cases, arrives at the following conclusions :

1.   All the patients to whom these injections have been given (in doses of 0.2 or 0.25 milligr.), bore the injections badly.

2.   The chlor-hyd. pilocarp. injected too frequently or in too large doses, gives rise to symptoms of intoxication or to syncope, which may prove fatal.

3.   There is no definite relation between the amount of the physiological effect and that of the therapeutical.

4.   The injections avail little or nothing against superficial diffuse keratitis, exudative aqua-capsulitis and haziness of the vitreous humor.

FIENZAL, (Paris), has used the remedy without good results. DENUCÉ, (Bordeaux), in one case where 0.10 centigr. had been injected, saw toxic symptoms resembling those of cholera. EUSTACHE, (Lille), in thirty cases has seen no benefit.   LEUDET (Rouen), provoked syncope with it, in a patient with cardiac trouble, and MASSART, (Honfleur), saw fatal syncope after the third injection.

In the International Med. Congress at Amsterdam, September, 1879, (Ophthalmological Section).   Prof. DOIJER read a paper upon myotic and mydriatic therapeutic agents.   Regarding myotic remedies he gave the following conclusions :

1.   The effect of eserine as compared with pilocarpine is as 32 to 1.

2.   Eserine in feeble doses affects only the pupil and has no influence on the accommodation.   Pilocarpine on the other hand, affects both even in minute doses.

3.   The myosis produced by eserine is more intense than that by pilocarpine, but does not last so long.

4.   A real difference is that the influence of the eserine is manifested rapidly, varying with the dose, while that of pilocarpine is not shown for about fifteen minutes.

5.   The effect of eserine is more lasting, sometimes remaining four days, while that of pilocarpine passes off in twenty-four hours at most.

6.   With eserine the effect upon the pupil and that upon the accommodation are sometimes in inverse relation, while with pilocarpine the relation is direct.

As regards mydriatic therapeutical agents, viz., Gelsemine, Atropine, Daturine and Duboisine, he concludes.

1.   The smallest quantity which effects a complete paralysis of accommodation is respectively $\frac{10}{2400}\frac{17}{2400}\frac{25}{2400}$.

2.   The paralysis from Gelsemine disappears after two hours, while that from the others lasts twenty-four hours.

3.   With all of them the dilatation of the pupil precedes the effect on the accommodation.

4.   While the pupil of the eye treated with the mydriatic dilates, that of the fellow eye contracts.

5.   While on the one hand, Gelsemine is preferable in certain cases, because its effect disappears so soon ; on the other, it is open to the objection of provoking nausea.   [S. B St. J.]

Iodoform and Alum in Aural Therapeutics.   Dr. Spencer of St. Louis, (*Am. Journ. of Otology*), recommends very highly the use of these two therapeutic agents in treating chronic suppuration of the middle ear.   He holds that iodoform, as a powerful and rapid promoter of absorption, might *à priori* be expected to accomplish great good in these obstinate cases where hyperplastic processes have occurred, as well as in secondary ulcerations.   The former class of cases are those in which he has secured the most brilliant results.   He presents a case in which a large papillary growth disappeared under a few applications of powdered iodoform made by means of the ordinary cotton holder, and also cases in which suppuration of the tympanic cavity of twelve, four and seven years duration were promptly healed :   cases in which the ordinary astringent and alterative remedies had been faithfully

tried without effect for many months. Dr. Spencer also finds alum very beneficial in cases where the pathological condition is just the opposite of that which calls for the employment of iodoform. He does not describe the condition, but says it is that stage of a suppurative process which requires mechanical protection rather than medicinal influence either local or constitutional, that it is when the sore has been deprived of its vicious elements through the agency of other remedies that alum often comes in and completes the cure. Neither alum nor iodoform are indicated in active processes of inflammation.   [S. B. St. J.]

Decalcified Bone Drainage-Tubes, and Permanent Dressings.

From advance sheets of the forthcoming number of *Langenbeck's Archiv* we make the following abstract of a paper by Dr. G. NEUBER, Privat-docent at Kiel and Prof. Esmarch's surgical assistant, on the use of decalcified bone drainage tubes in antiseptic permanent dressings. These drainage tubes are made of different sizes by turning and drilling cylinders of bone, removing the lime salts by maceration in a mixture of one part of muriatic acid and two parts of water, hardening them in alcohol, and preserving them in carbolized oil, 1:10. This makes a firm rigid tube, having somewhat the appearance of glue. The tubes are used like ordinary drainage tubes, made fast to the edge of the wound, and cut off flush with the surface. If the wound does not suppurate all that portion of the tube which lies below the surface is absorbed by the action upon it of the granulations, and the outer portion comes away in the dressing as a small ring. If the wound suppurates freely the tube is not absorbed ; and if the wound bleeds and a clot forms about the tube, the latter remains unchanged for an indefinite period under the skin, which heals over it. This happened only once in upward of two hundred trials, and then the presence of the tube was mistaken for a return of cancer in the axilla, and led to a second operation.

The results obtained by Esmarch by the permanent antiseptic dressing with the aid of these tubes are well worth notice. He obtains primary union and complete closure of the wound in about fourteen days under a single dressing after removal of tumors, amputation, and resection of joints ; and even after operations for the removal of a sequestrum or of carious bone Dr. Neuber has found the wound almost healed after the lapse of the same period.

His method of dressing is based strictly upon the principles en-forced by Mr. Lister. After careful arrest of bleeding and clos-ure of the wound by catgut sutures, he places over it a square bag of gauze filled with carbolized jute, and fixes it there by means of a carbolized gauze bandage, striving especially to obtain adequate and uniform pressure so as to keep the divided surfaces in con-tact. With the same object in view he then surrounds the limb with a firmly drawn rubber band, the turns of which overlap the dressing by at least two finger-breadths on all sides.

Five months' experience with the tubes and this mode of dress-ing gave the following results : 101 operations, including 12 am-putations of the thigh, healed under a single dressing in a fort-night or less, all but six of them without suppuration, and all with-out fever other than the rise of temperature which sometimes occurs in the first two or three days after an operation, and is known as " aseptic fever." 27 other cases required more than one dressing ; of these 16 were without fever and with but slight, if any, suppuration. The remaining 11 showed temporary rise of temperature and moderate suppuration. 3 cases died : 1st, an amputation of the thigh in a septicæmic patient ; 2d, a removal of cancer of the neck, death caused by hypostatic pneumonia ; 3d, a resection of the hip, death by collapse in six hours. (*Langen-beck's Archiv*, Bd. xxv, Heft. I.)   [L. A. S.]

ORIGINAL OBSERVATIONS.

EXTRACTION OF A SPLINTER OF WOOD FROM THE CORNEA.*

BY DAVID WEBSTER, M.D.

OF NEW YORK.

The patient, a child nearly three years of age, was brought to
the Manhattan Eye and Ear Hospital on January 26, 1880, by
his mother, who gave the following history of his case : About the
latter part of July or the first of August, 1879, the child ran
against an apronful of wood which a woman was carrying through
one of the narrow passages of a tenement house. As soon as the
crying, the immediate effect of the collision, had ceased, the
mother observed that his right eye was closed. She opened it
and examined it as well as she could, but could not find any
" dirt " in it. The eyeball was red and watery, and very irritable
The mother did nothing for the eye for a week or ten days but
bathe it with salt and water occasionally. It became worse, how-
ever, instead of better, and then, by the advice of her friends, she
began to apply bread and water poultices at night and sometimes
by day. These seemed to soothe the eye to some extent, but it
still continued to be more or less inflamed or irritable, and in
October she took the child to a physician for the first time. The
doctor said the child had an ulcer of the cornea, and ordered
atropine eye drops. The physician saw the child only four times,
when domestic troubles caused the mother to neglect him. From
that time until he came under my observation the eye behaved in
a most capricious manner, appearing almost well one day and the
next being very much inflamed. When the eye became red, irri-
table, watery, and sensitive to light, atropine and bathing were

resorted to with good effect. But these unpleasant symptoms were sure to return, and at last, six months after the accident, the mother determined to consult a physician again.

When I saw the child there was considerable irritability of the eye and sensitiveness to light, so that it could be examined with difficulty. Upon raising the upper eyelid I saw, at the upper and outer part of the cornea, extending from the periphery toward the centre for about 3 mm., and about 6 mm. in length, of a greyish white color with, perhaps, a slight yellowish tint, a dense infiltration, clearly defined against the transparent cornea. A whitish streak, forming a slightly elevated ridge, could be traced obliquely inward and upward across the opacity. A few bloodvessels could be seen running from the limbus across the opacity. The conjunctival injection was slight. At the lower margin of the cornea was a localized pinkish injection about 2 mm. square. Iris and pupil normal.

The appearance of the eye is very well shown in the accompanying sketch made on the spot by my friend, Dr. J. A. Andrews.

This certainly would be a most extraordinary form of opacity for ulcerative or phlyctenular keratitis, and I immediately asked myself the question whether a splinter of wood might not be embedded therein.

The eye was then examined by my friend, Dr. Oren D. Pomeroy, and by several other experts, both by daylight and by artificial light, and all agreed with me that, although the presence of a foreign body could not be positively demonstrated, the probability of the existence of one was sufficiently strong to justify an explorative operation.

Accordingly, the child having been put to sleep with ether, the eyelids were opened with a spring speculum, and, while the eyeball was steadied with fixation forceps, a particle of lymph at the margin of the cornea corresponding to the extremity of the suspected splinter being gently scraped away with the point of a Beer's cataract knife, the foreign body at once became visible, and was removed without difficulty.

It proved to be a splinter of wood, 4 mm. in length and 0.5 mm. in width. Nature was evidently making an attempt to get rid of the foreign substance, for just so soon as the lymph plugging the mouth of the canal in which it lay loosely embedded was removed, it came away almost of its own accord.

I saw the child two days later, and all signs of irritation had disappeared. So little of the corneal infiltration remained that it could only be seen on careful inspection.

The case may, I think, be called an unique one. It is remarkable that so large a foreign body should have remained embedded in the cornea for so long a time without producing more serious results. I have seen a case where a minute particle remaining embedded in the cornea for five months produced kerato-iritis with synechia posterior, with considerable sympathetic irritation of the fellow-eye.

AMENORRHŒA, CONVULSIVE ATTACKS, OOPHORECTOMY.
RECOVERY AND CURE.

By Dr. F. WEST,
OF BALTIMORE.

Mrs. G. M., æt. 29, mother of one child, living. Her history and condition when I first saw her were as follows : Was well, up to her last confinement, six years ago, since which time she has been bed-ridden and subject to continuous pelvic pain.

These pains grow worse as the time for the menses approach, and culminate in convulsive seizures which last about a week, and which are unaccompanied by anything like a menstrual flow. She also suffers from asthma and vomiting, which nothing seems to check.

She first came under my observation Oct. 19, 1878, and upon

examination I found the cervix lacerated in four places quite up to the vaginal junction. The uterus was in place and about 8 cm. in depth.

Prof. W. T. Howard, of this city, saw the case with me and proposed an operation for the restoration of the lacerated cervix. This he performed in May last, and for a month or two she was easier and menstruated slightly, but had the convulsions as usual and the most terrific pain I ever saw any one suffer.

She was also an opium eater and had learned to use ether and chloroform *ad libitum*.

After having tried everything in medicine and seeing them all fail, I concluded that spaying was the only thing left that was likely to do her any good. I had read Dr. Wm. Goodell's pamphlets on the subject, and called on the doctor who very kindly gave me all the points that were necessary.

On January 1, 1880, in the presence of Drs. Alan P. Smith, H. P. C. Wilson, L. McLane, Tiffany Michael, W. W. White, and several of my younger medical friends, I proceeded to operate. The patient was chloroformed and put in the exaggerated lithotomy position. An incision was made through the vagina as directed in Dr G's. paper, when the left ovary was secured with but little trouble.

At first I tried carbolized gut ligatures, but as they broke I substituted silk. The ends were cut short and the Fallopian tube and ovarian ligament were returned to their place. The right ovary was very high in the pelvis and the incision had to be enlarged before it could be reached. The Fallopian tube was greatly congested and hard, and the ovary much larger than the left. It had no pedicle and was very difficult to ligate. The ovary was also very much torn by the tenaculum used in holding it. The catgut broke and silk was again substituted. There was a great deal of hemorrhage from an abrasion of the Fallopian tube ; this was, however, finally stopped and the parts returned to the abdominal cavity. The cavity of the pelvis was then pumped full of hot carbolized water, continued until the stream returned clear.

Immediately after the patient was put to bed and got under the influence of morphia. The vaginal wound was left open.

For the first four days the whole abdominal cavity was washed out night and morning with warm carbolized water, by passing a soft rubber catheter through the incision. There was vomiting for the first three days and a great deal of discharge. The nourishment consisted of milk and lime-water. The temperature

never went higher than 38. 7° C. (101. 6° F.) and the ligatures were discharged about the tenth day through vaginal wound which had nearly closed.

As she is an opium eater I am having some trouble from that quarter, but the pain is all in her head.

This time last month she was suffering intense anguish, while now, beyond a certain amount of peevishness, everything seems normal. Time alone, however, will determine how much good has been accomplished.

NOTE—Later advises from Dr. West up to March 10th, report the patient as steadily improving, and apparently going on to perfect recovery.—*Ed.*

ON THE USE OF THE SO-CALLED EXTENSION SHOE, IN THE SECONDARY CONTRACTURE OF THE MUSCLES OF THE CALF ATTENDING SPASMODIC IN-FANTILE HEMIPLEGIA.

BY CLOVIS ADAM, M.D.,
NEW YORK.

Not being aware that any positive benefit has been derived from the different modes of treatment recommended in text-books, and usually followed by surgeons, for the remedying of the deformities and *contractures* that usually attend spasmodic infantile hemiplegia, I venture to narrate, very briefly, the history of a case of the kind which is under my care, and the results arrived at by the use of the extension shoe.

J. C——, a boy three years and three months of age. In March, 1879, his father asked me to treat him. On first examining him I found that his right arm and leg were paralysed and contractured ; being much weaker than the limbs of the opposite side. The arm was in a flexed state at the elbow ; the hand closed with the thumb in the palm, and the other fingers flexed pretty tightly over it. The leg also was somewhat flexed at the knee and the foot was a fair specimen of *pes equinus ;* the heel being raised, by contract-ure of the calf muscles, nearly 2.5 cm. from the floor, the tip of the foot somewhat turned in, so that the weight of the whole body

rested on the tarso-phalangeal articulations. Electric reaction (faradic) slightly diminished in the extensors of the toes and tib- ialis anticus. Sensibility normal. On trying to flex the foot on the leg, I succeeded in doing it only imperfectly—the tendo achi- lis and the bellies of the gastrocnemius and soleus were so tense as to prevent complete flexion.

The child was immediately put under treatment, and all the means most in vogue at present were used, viz.: electricity, mas- sage, passive movement, etc., with good effect, as far as the gen- eral strength of the paralysed limbs and the use of the hand in particular were concerned. Indeed, since patient was seven months old, the time when the mother first noticed that he could not use his hand, until treatment was instituted, he could not take hold of anything. Shortly after we had commenced the treat- ment he tried to use his hand, and now he can use it for eating ; the leg, also, gained considerably in strength, for the child who could not get up without help when sitting on the floor, now can climb up a chair, go up and down stairs with comparative ease ; but meanwhile, the contracted muscles instead of getting better, seemed to have been getting gradually worse. In this circum- stance, after having used all imaginable means without result, I decided to employ the extension shoe, and this was applied for the first time on the 11th of last February. By means of this ap- paratus I succeeded in gradually flexing the foot over the leg to such a point as to have been able to keep the calf-muscles over- extended for several days. At the end of the first week the ap- paratus was removed, with the intention of having the child's foot washed and renewing the bandage which was getting rather loose. After the removal of the apparatus, the child went on walking about, and succeeded in bringing his heel completely down. Nev- ertheless, I re-applied the apparatus : but unfortunately on the 27th of the same month, I was compelled to remove it again on account of a sore that had been formed, caused by the instep strap having been applied too tightly. Notwithstanding this drawback, since then until to-day, March 10th, the child has been going about without any apparatus, with a perfectly good foot ; his heel having no tendency to return to its former vicious posi- tion.

I may add that the patient was shown on March 6, 1880, by Dr. E. C. Seguin, at his Clinique for Diseases of the Nervous System, and that he then walked perfectly flat-footed. The hand was also free from contracture.

This case is reported with the view of showing that :

1st. The contractured state of the muscles attending spasmodic infantile hemiplegia, can be overcome.

2d. The time required to overcome it is very short ; one week, probably less.

3d. Once overcome it shows no marked tendency to relapse.

ARCHIVES OF MEDICINE.

Original Articles.

PREGNANCY–VOMITING.

By J. MARION SIMS, M.D., LL.D.

PREGNANCY–VOMITING has long been regarded as a reflex symptom, but has never been treated as such until very recently

A few years ago Graily Hewitt enunciated the doctrine that it was due to flexure and malposition of the uterus, and published cases confirmatory of this view.

In February, 1878, Dr. M. O. Jones, of Chicago, published a paper on this subject, in the *London Lancet*, in which he took the ground that it was due to congestion or granular erosion of the cervix uteri, and that it was to be treated locally by nitrate of silver or other escharotic, and he related several cases relieved by this treatment.

Three or four years ago the late Dr. Copeman, of Norwich, England, brought the subject prominently before the profession by various articles published in the *British Medical Journal*, in which he maintained that it was due to induration of the cervix uteri and contraction of the canal. On this theory he simply dilated the cervix mechanically with the happy result of curing his cases in two, three or four days.

Many of them were cases of a very rebellious character,

in which the patients were greatly prostrated from prolonged vomiting and consequent inanition.

Others have reported cases in the *British Medical Journal*, treated successfully and speedily by Copeman's method.

I have seen several cases relieved in a few days by Dr. Jones' method. In all of these there was granular erosion, to which I applied a solution of nitrate of silver, ℥ i to the ounce. In 1878 I saw a case in Paris, at the third month, where the vomiting was excessive and uncontrollable by ordinary means. The cervix was small and indurated; but there was no granular erosion. However, I applied a solution of nitrate of silver two or three times, but without any decided improvement. I then tried dilatation of the cervix according to Copeman's plan. There was marked improvement in three or four days. But she was not wholly relieved. The uterus was ante-flexed. The fundus was bent slightly forward toward the pubic arch, while the os tincæ looked directly in the direction of the vaginal outlet, and the whole organ seemed to sink deeply in the pelvis. A Meigs ring elevated the uterus and gave relief to the distressing symptoms.

Possibly my patient would have been relieved by the dilatation if I had persevered with it. However the pessary was a valuable adjunct to the dilatation, and rendered the cure complete.

Copeman's method consists in gradually forcing the finger into the os and carrying it along till the first joint of the finger enters the cervical canal, taking care not to push it so far as to impinge against the os internum.

Theoretically this would appear to be hazardous; there would be some risk of producing abortion. But so far we have reports only of successful results.

I desire to place on record here the history of a case which may serve as a guide and warning in similar cases hereafter :

Mrs. E. aged 35, a blonde, of medium height, weighing 120 pounds, was married at 16, and at 17 gave birth to a child at full term.

She had puerperal convulsions; was in labor thirty-six hours; and a dead child was delivered with forceps. She was in convulsions for twenty-four hours before the forceps were used, and was dangerously ill for two or three weeks afterward. She lost her mind entirely for several days; forgot even how to comb her hair; and had to learn how to do many things like a child.

A whole month passed away before she recovered her faculties entirely. Eighteen months after this she gave birth to a second child at full term. The labor was natural and her recovery prompt. But remembering the dangers of her first confinement, and having had a constant dread of convulsions in the second, she determined if possible, to avoid another pregnancy. She consulted medical men in various parts of the country, and thought herself perfectly justified in refusing to become a mother again. In 1869 she had a miscarriage which was produced because she was afraid of puerperal convulsions if she should go the full term. Ten years after this, in September, 1879, she had another miscarriage at the third month, which was wholly accidental.

Prof. Reamey attended her in this miscarriage. She was exceedingly ill and barely escaped with her life.

The business affairs of her husband compelled him to leave Cincinnati before his wife entirely recovered, and she insisted on accompanying him, contrary to the advice of her physician; so, about ten days after the accident she came to New York, and was under my care for a month before she entirely recovered. Then on April 3, 1880, she returned again to New York after an absence of four months, and I found her pregnant two months and a-half. She suffered exceedingly with nausea and vomiting —vomiting almost everything she ate.

For three or four days I gave her the ordinary remedies under such circumstances, but without avail. I then examined critically the condition of the uterus and found it flexed at the os internum, the fundus looking toward the pubes, and the os tincæ toward the ostium vaginæ. The cervix felt rather indurated and the canal was contracted. There was no granular erosion—and I concluded to try Copeman's method. I forced the point of the index finger into the os to the depth of the finger nail, about half an inch. On the next day I did the same thing, carrying the finger a little further,

and after this she had less nausea. On the third day I repeated the operation, passing the finger into the cervix uteri, but could not pass it any further than I did on the preceeding day, because as the body of the uterus was flexed forward, the cervix would be driven back toward the sacrum by the pressure, so that it was impossible to pass the finger in deeper than I had previously. To overcome this difficulty I pushed the fundus of the uterus backward with the left index finger in the vagina, and held it there by pressure of the right hand above the pubes, when it was easy enough to pass the left index finger nearly to the depth of the first joint into the cervix, which is about three-fourths of an inch.

I held the uterus in this position for a minute or two, forcing the fundus back toward the promontory of the sacrum with the right hand externally, while the index finger of the left was used for the dilatation of the cervix.

After this the nausea disappeared entirely, and my patient was able to take food freely. Two days after this I found her complaining of intermittent uterine pains threatening miscarriage. I resorted to large doses of opium but with no effect, for on the next day the fœtus was thrown off.

The placenta partially protruded through the os tincae, and the neck of the uterus was sufficiently dilated to allow the passage of the finger into the cavity. I found the placenta adherent to the anterior wall near the fundus where it was with difficulty separated by the finger, and removed, and all bleeding ceased. After this my patient recovered rapidly.

I report this case to show that the Copeman method is not always free from danger, and I believe it is the first one on record in which any accident has occurred. Of course a woman who has had one or two miscarriages, is always more liable to have another on very slight provocation, and this seems to have constituted the danger in this case, for my patient had had two miscarriages.

During my residence in Paris some years ago, I saw two deaths from pregnancy–vomiting, and I saw two cases that were snatched from the jaws of death by the induction of abortion. Prof. Trousseau and Dr. Johnston of Paris, were consulted in these two cases, and both agreed that prompt abortion was the only means of saving life.

In this connection I wish to put on record the history of a case, which, from mere personal considerations, I ought long ago to have published. I report it now to clear myself from censure which I have (not very patiently) endured for the last seventeen years.

On January 4, 1863, I was consulted by Mme. X., young, beautiful, and representing two of the first families of the aristocratic Faubourg St. Germain. This young woman had been married three or four years, and consulted me on account of her sterility. She had complete vaginismus, and the marital relation was a physical impossibility.

I explained the nature of the operation necessary for her relief ; she was exceedingly anxious for offspring, and gladly submitted to the operation. It was performed on January 20, 1863.

Sir Joseph Olliffe and Dr. Johnston assisted me. Dr. Johnston gave ether. She was well of the vaginismus in a fortnight, and she conceived three months afterward. Within a week after conception she began to vomit. She had retroversion, and I replaced the uterus and applied a Hodge pessary, which held the organ in its place.

In June I went to Baden-Baden, and my patient and her husband followed me there soon afterward. The nausea and vomiting grew worse from day to day, although the uterus was held perfectly in place by the pessary. They remained at Baden about six weeks. I became very anxious about my patient, and I told her husband that I feared it would be necessary to produce a miscarriage, if his wife did not soon change for the better. And he replied that she must determine this question for herself.

A few days after this, early in August, they returned to Paris. I went with them and placed my patient in the hands of Dr. Campbell, then the fashionable accoucheur of Paris. After examining Mme. X's case carefully, he said that he had safely brought through many cases of severe vomiting in pregnancy and he thought he could tide Mme. X. over all danger.

She was failing fast, and I did not believe it possible for her to live, and insisted on his producing miscarriage. He said, "no, let us wait a few days longer, I see no immediate danger." I was so anxious about Mme. X. that I then went to her mother, and told her that I considered her daughter's life to be in great danger, and advised abortion at once as the only means of safety.

She objected most positively, saying that she was the mother of five children, that she had vomited from the beginning of conception to the sixth and seventh month of each pregnancy, and went through safely, and she did not see why her daughter should not be as fortunate as she was.

Lastly I laid the subject before Mme. X., telling her frankly that her life was in danger if we should allow the pregnancy to go on. She said she had hoped and prayed for conception for the last three years ; now that her prayers had been heard she would not for a moment entertain the thought of miscarriage ; and then she told of her mother's patient sufferings under like circumstances. I then left Mme. X. in the hands of Dr. Campbell, and returned to Baden.

A week afterward I received a letter from Dr. Campbell saying that my patient was growing weaker every day, yet he hoped to bring her through in safety. A few days after the reception of this letter Mme. X. arose at seven o'clock in the morning, against the express orders of her physician, and got out of bed to attend to a call of nature. In doing this she fainted and fell over on the floor. The nurse, sleeping in the adjoining room, heard the fall, and rushed to her assistance. She was taken up and laid in bed in a state of unconsciousness. Dr. Campbell was immediately summoned. He arrived at eight o'clock, and found her in a very restless and nervous condition, with hurried breathing and rapid pulse. He could not understand the nature of this sudden attack, and sent for Prof. Trousseau, As soon as Trousseau saw the distressed panting, and rapid breathing, and felt the flickering, irregular pulse, he said that when she had fallen over in syncope, a clot had formed in the heart, and that she would die of embolus in three hours. She died at half past twelve—two and a half hours from the time of Prof. Trousseau's visit.

The death of this young woman was a great shock to society in the Faubourg St. Germain. And the daily press in noticing her death, said, " her physician is to blame for it." It was immediately reported all over Paris that I had performed an operation on the cervix uteri for sterility on Mme. X., and that it had caused her death. And to this day, this is believed by the medical profession in Paris.

Only last year a lady from the Faubourg St. Germain came to consult me on the subject of her sterility, and when I examined her case, I told her it was one that no treatment could relieve short of an incision of the cervix uteri. Her mother was with her, a lady of great intelligence and high social position (speaking English admirably), and she replied : " I can never consent to that operation, because it is the same that you performed many years ago on Mme. la Comtesse X., which resulted in her death." When I explained to her the nature of the operation I had performed on that lady, she said that everybody in Paris was laboring under an error in regard to it ; and that she had heard more than one medical man speak of it who had told her that I had incised the cervix uteri in the case of Madame X., and that she had died in consequence of the operation.

Now it is to disabuse my brethren of the medical profession in Paris, that I have related the history of this case, hoping that they will at this late day do the same justice by me that they would have others do by them under like circumstances. All that could have been done at that time to save the life of Madame X. was to produce a miscarriage. I did my whole duty in the mater by urging this upon her and her husband and mother, and upon Dr. Campbell.

They unfortunately took an opposite view and my patient died. Her mother is now dead. Sir Joseph Olliffe, the consulting physician, died in 1868, and Dr. Campbell died a year ago. But Dr. Johnston, who was consulting physician and assisted at the operation I performed on Madame X., still lives in Paris, and can testify to the truth of my statement in regard to this unfortunate case.

With the light before us now, let us hope that we shall hear no more of deaths from pregnancy-vomiting, nor even of miscarriages induced to save the lives of mothers.

To the writings of Graily Hewitt, Jones and Copeman, we are indebted for direct and practical methods of treatment which seem to promise success in the management of these troublesome cases.

Yet these methods are not without a certain amount of risk, and must be cautiously tried.

In Graily Hewitt's plan we must be careful not to make undue pressure on the cervix uteri with the pessary. In Dr. Jones' plan, we must place the patient in the left lateral semi-prone position, apply a Sims' speculum, expose the cervix without touching it with the speculum, and then pencil the caustic solution on the granular surface and on that alone.

In Copeman's plan, we must gently insinuate the end of the index finger in the os tincæ and pass it into the cervical canal not more than three-fourths of an inch deep. This is to be done with the patient on her back. If the uterus should be flexed anteriorly (as it usually is in such cases), I must caution the operator not to throw the fundus up and push it back toward the promontory of the sacrum with the bi-manual method. For this bi-manual pressure in the early months of pregnancy may provoke abortion.

Of course we should not resort to this heroic method of treatment unless the case is urgent and rebellious.

ON THE PHYSIOLOGICAL ACTION OF THE BULB OF THE BUPHANE TOXICARIA OR HEMANTHUS TOXICARIUS ; AMARYLLIDACEÆ.

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A FEW specimens of the large South African poisonous bulb, Buphane toxicaria, were sent to the Royal Gardens, Kew, and Mr. Thiselton Dyer kindly gave us one to test the physiological action of the plant. The Hottentots use this plant to poison their arrows. It is highly poisonous to cattle. Mr. Gerard prepared for us an extract, from which he obtained an alkaloid, the extract yielding about 1.75 per cent. of it.

In the first series of experiments we used the extract.

On April 1st we injected under the skin of a cat seven minims of a 1 in 5 solution of the extract. In about twenty minutes this made the animal dull and a little sleepy. An hour from the first injection we administered hypodermically 8 minims of the solution, which increased the drowsiness and produced decided weakness, so that in walking the cat rolled somewhat ; the hind were weaker than the front legs, and the animal became so drowsy that when left to itself it fell asleep and nodded.

Next day we injected the same cat hypodermically with 8 grains

of extract (50 minims of the 1 in 5 solution). This caused slight weakness, twitching of the skin, retching and vomiting.

On April 5th we injected into the same cat 20 grains of extract which caused drowsiness, great weakness, especially of the hind limbs, though throughout the experiment the cat could walk, but it lay down with its head on the table. On the slightest irritation, as tapping the back, or even a loud noise, the whole body started and jerked. The pupils were dilated, but acted to light, and the mouth became dry. Sight seemed affected, and general sensation became impaired.

We next injected 27 grains of extract, and produced still more marked symptoms, nausea and retching, strong semi-tetanic twitchings and startings on the slightest irritation or from noises, and at one time the twitchings were almost incessant.

The animal grew so weak that it could scarcely stand, and as the weakness progressed the twitchings diminished. The weakness was most evident in the hind part of the body. Sensation was impaired. The startings were produced much more easily on irritating the anterior than the posterior part of the body. The pupils became widely dilated with loss of sight. The mouth was dry ; the respiration much hurried and very shallow, at one time being 78 in the minute. The cat was drowsy. In four hours the cat had nearly recovered and next day, except being rather dull, it was quite well again.

These experiments show that this bulb produces drowsiness, general weakness, tremors, heightened reflex irritability, so marked that stimulation causes strong jerkings of the whole body, impaired sensation, dilatation of the pupil with dimness of vision, dryness of the mouth, nausea and sickness, hurried and shallow breathing.

Two experiments on frogs show that the extract, in large doses causes general paralysis and tetanus.

We injected under the skin of a frog one grain of the extract, being $\frac{1}{640}$ part of the animal's weight.

This produced slight weakness which passed away in an hour. In 104 minutes slight tetanic startings set in ; on hopping the body of the whole animal jerked slightly, the legs were slightly extended, the feet expanded. The frog's movements, too, were stiff and awkward. The tetanus slightly increased, but though distinct, was never severe. It continued about 72 hours, and the animal had quite recovered. To another frog we administered $\frac{1}{164}$ part of its weight of extract, and in ten minutes the animal

became weak ; in 34 minutes tetanus began, and both paralysis and tetanus increased till the tetanus became strong and persistent, but the paralysis became complete. Twenty-four hours after death we opened the chest and found the heart stopped in wide diastole. Slight stimulation caused the heart to beat thoroughly 20 in the minute, though after some minutes the contractions again ceased.

These experiments on frogs, confirm therefore, the experiments made on the cat. With the cat we produced great general weakness with slight tetanic twitchings. In frogs the drug induces the same symptoms, but with much more marked tetanus.

We next investigated what structures were affected by hemanthus. We first experimented to ascertain whether the tetanus is due to the action of the poison on the brain, cord, nerves or muscles.

In two experiments we injected, in each case, a grain and two-fifths of the extract under the skin of the frog. Then on the onset of tetanus we destroyed the brain, and still the tetanus became well marked. Next we divided the sciatic nerve of one leg, and found that tetanus could not be induced in that limb, showing that the tetanus is not caused by the action of the poison on the nerves or muscles, and that the tetanus is not due to the action of poison on the brain ; since tetanus occurs after destruction of that organ, and must therefore be spinal.

We next experimented to ascertain what structures are implicated when hemanthus acts as a paralyzer ; whether through the brain, spinal cord, nerves or muscles.

As hemanthus destroys reflex action as well as voluntary power, and even after the brain is destroyed, it is evident that it paralyzes by its action either on the cord, the motor nerves or the muscles.

On April 17th we poisoned a moderate-sized brainless frog by injecting seven minims of the 1 in 5 solution of extract, and when complete paralysis set in we exposed the sciatic nerve and muscles, and tested these with the interrupted current. We found

that a very weak current applied to the nerve caused the muscles to contract strongly, and that a weak current applied directly to the muscles stimulated them to strong contraction.

April 17th.—Next we injected under the skin of a frog weighing 25 grammes three grains of extract. In 40 minutes it began to grow weak, and then general paralysis and tetanus simultaneously progressed, so that at the end of an hour the animal could just crawl a little, but if tapped the shock induced decided but not very strong tetanus extension of the legs. Next day, 17 hours from the commencement of the experiment, we found the animal quite paralyzed. We then exposed the sciatic, and muscles of the leg, and found that a weak galvanic current caused the muscles to contract strongly, but the sciatic nerve itself was completely paralyzed.

Since the application of a weak current of electricity to the sciatic nerve, after complete paralysis induces strong muscular contraction we conclude that the paralysis is not due to paralysis of the motor nerves ; and as the muscles also contract energetically on the direct application of a weak current of electricity, it is equally apparent that the paralysis is not due to paralysis of the muscles ; hence we must conclude that hemanthus paralyzes by its action on the spinal cord.

Although the preceding experiments, we think, prove that hemanthus paralyzes by its action on the spinal cord, we determined to perform the following supplementary experiments, especially as they enable us to decide whether hemanthus possesses likewise a paralyzing action on the motor nerves, though it must needs be a far weaker action than this agent produces on the cord ; moreover these experiments serve to show whether the paralysis of reflex action is due to the action of the poison on the sensory nerves, preventing the impressions reaching the cord.

We injected the extract under the skin of the back close to the lymph hearts, and as soon as tetanic symptoms set in, that is in about forty minutes, we destroyed the brain, cut through the

heart, and divided the sciatic nerve of the right leg, to prevent the exhaustion of the nerve and muscle by tetanic contractions.

We then prepared some test frogs. We destroyed the brain, cut through the heart, and divided the right sciatic nerve so that the condition of the test frogs should be, in all respects, identical with that of the poisoned frogs except the poisoning. Then we tested with electricity the conductivity of the sciatic nerve and the contractibility of the muscles thrice daily, at 9 A.M., 1 P.M. and 6 P.M. First we tested the sciatic nerve through the skin, so that its function might not be impaired by exposure to the air; and when the nerve so treated ceased to conduct, we exposed it, and, having isolated it on glass, tested it.

THE ACTION OF EXTRACT OF HEMANTHUS ON THE MOTOR NERVES AND MUSCLE.

Date	Brain destroy'd, heart cut through and sciatic nerve divided after poisoning.	Amount of extract injected.	Weight of frog in grammes.	Right sciatic nerve ceased to conduct in.	Muscles of right leg ceased to contract.
Apr 18.	39 mins.	3 grains.	20 grammes.	25 hours.	
22.	35 mins.	3 grains.	26 grammes.	28 hours.	39 hours.
22.	55 mins.	3 grains.	34 grammes.	30 hours.	39 hours.
25.	30 mins.	3 grains.	25 grammes.	38 hours.	48 hours.
25.	43 mins.	3 grains.	31 grammes.	30 hours.	35 hours.
			Average	30.2.	40.5.

TEST FROGS.

Apr 18.				34 hours.	72 hours.
22.				40 hours.	83 hours.
25.				34 hours.	82 hours.
				49 hours.	49 hours.
			Average	39.2.	71.5.

We abstract the following averages from the preceeding table:

The sciatic nerve ceased to conduct.	In poisoned frogs in 40 hours.	In test frogs in 39 hours.
The muscles ceased to contract to a strong galvanic current.	30 hours.	71 hours.

We conclude that extract of hemanthus paralyses the motor nerves and muscles in a slight degree: The dose of alkaloid administered was small, for we used three

grains of extract, and the extract contains only about $1\frac{3}{4}$ per cent. of alkaloid. We shall, therefore, test with larger doses the action of the alkaloid on the motor nerves and muscles.

Before, however, we are justified in concluding that he-manthus paralyses chiefly through its action on the cord, we must be certain whether it exercises any influeuce on the afferent nerves ; for if it paralyses these, then no impres- sions could reach the cord, and we could account for the general loss of reflex action by the paralysis of the affer- ent nerves. We must ascertain too whether hemanthus paralyses the heart, and in this way arrests the circulation ; for if so, paralysis of the spinal cord may be due to the ar- rest of circulation, and not to the direct action of the poison on the cord. To decide these questions we performed the following experiments :

We destroyed the brain, then ligatured the right femoral vessels, next placed a tight ligature around the muscles of the upper part of the thigh under the skin, taking care to exclude the sciatic nerve, and then injected three grains of extract into the left axilla. The frog became slowly paralysed, and when par- alysis became complete we found that pinching the toes or calf of the right ligatured leg failed to excite any reflex action.

On April 29th we somewhat modified the experiment. After de- stroying the brain we tied the right femoral artery and vein of a mod- erate sized English frog, and then injected fifteen minims of the 1 in 5 solution of extract under the skin of the left axilla. In twenty- eight minutes tetanus commenced and progressed *pari passu* with general paralysis, and in two hours and ten minutes the animal was completely paralysed, so that mechanical stimulation of *either* extremity excited no reflex action. The paralysis progressed equally in both hind legs. In this experiment ninety minutes after complete paralysis and in the foregoing experiments in thirty minutes we opened the chest and found the heart beating fairly well at fourteen per minute.

These experiments prove that the loss of reflex action is not due to paralysis of the sensory nerves, for stimulation

of the ligatured protected leg failed to excite reflex action. Moreover the paralysis of the spinal cord is not due to arrest of the circulation from cardiac paralysis, for after complete paralysis we found the heart beating at twelve per minute.

ACTION ON THE FROG'S HEART AND VAGUS.

Dr. Burdon Sanderson kindly tested for us the action of extract of hemanthus on the heart and vagus of the frog :

After exposing the vagus just as it issues from the skull and exposing the heart without opening the pericardium he applied the electrodes to the vagus, and as usual the heart was arrested for several beats. After testing the effect of galvanic stimulation of the vagi three times with the same result, he injected three grains of extract, diluted with water, under the skin of the back and then tested the effect of faradisation of the vagus, and found that even the strongest current from a one-celled Daniel's battery with Du Bois Reymond's induction coil failed in any degree to affect the heart's contractions. He then opened the pericardium and applied the electrodes to the junction of the sinus with the auricle which slightly accelerated the heart's contractions during contact, but this acceleration ceased on removal of the electrodes, when perhaps a slight slowing for a second or two occured, so slight, however, that we cannot be sure of it.

This experiment we repeated with exactly the same result ; but we poisoned the animal with one grain only of the extract.

We next tested the action of hemanthus on the intracardiac inhibitory apparatus.

We poisoned two brainless frogs by injecting under the skin of the back a grain and two grains respectively. An hour afterward we opened the thorax and pericardium, and then turning the heart over exposed the sinus as it enters the auricle. In this operation, in the first experiment, we unfortunately divided the abdominal vein. The heart was contracting badly at 32 per minute. We applied the electrodes to the groove between the sinus and the auricle, without in any way modifying the contractions.

In the second experiment, May 8th, 34 minutes after poisoning we exposed the heart, and found it beating well at 18 per minute. We then applied the electrodes to the sinus, and this raised the beats to 26, but rendered them feeble. We repeated the application in ten minutes with the same result. After removing the electrodes a slight pause occurred, but far less than happens after the application of the electrodes to to an undrugged heart.

On another occasion we exposed the heart of a frog whose brain and cord were destroyed, and then applied the electrodes to the groove between the sinus and the auricle, and ascertained the strength of the current adequate to powerfully inhibit the heart. We then applied a solution of the extract to the heart, and in a few minutes found that a current of the same strength failed to arrest or slow the heart, but made the beats more frequent. On increasing the current to the battery's full strength, slight slowing, we think, followed for one or two beats, succeeded by accelerated action.

These experiments lead us to conclude that hemanthus paralyzes the vagus, and greatly weakens and even paralyzes the intra-cardiac inhibitory apparatus.

These experiments show that large doses, as two or three grains of extract, given hypodermically to a moderate sized frog slows and weakens the heart, but after several hours it still continues to beat moderately well at twelve to fourteen per minute.

We next tested whether hemanthus antagonizes the action of muscarin on the frog's heart. We exposed the heart of a brainless frog, and applied a 1 in 5 solution of extract of amineta muscaria in the neighborhood of the sinus and auricles. When the heart became greatly slowed and weakened, or altogether arrested, we applied the extract of hemanthus. We give the results in the following table :

In a previous communication * we showed that one drug may oppose the action of another drug though each produces the same effects. Thus pilocarpine antagonizes the action of muscarin on the frog's heart. As hemanthus

affects the heart like atropia, we were anxious to see if atropia would antagonize the effect of hemanthus. We give two experiments showing that atropia does not antagonize the action of hemanthus.

Date	After application of muscarin heart reduced from to.	Strength of contraction.	After application of extract of hemanthus, heart beats rose to.	Strength of beat.	
May 12.	48 to 8 in eight minutes.	V e r y feeble. auricle c e a s-ed.	28 in 3 minutes to 34 subsequently.	Very good.	Three hours after the heart beat fairly well at 34. Next morning the heart had s t o p p e d. widely distended but quite pale.
13.	48 to 0 in two minutes.	stopped.	34 in 4 minutes.	F a i r l y good.	
13.	48 to 0 in seven minutes.	stopped.	24 in 9 minutes.	Poor.	

On May 8th we exposed the heart of a brainless frog, and applied a 1 in 5 solution of hemanthus to the sinuses and auricles. This reduced the heart's beats from 56 to 20, and greatly enfeebled their strength. We then applied a small quantity of a 1 per cent. solution of sulphate of atropia; the contractions became stronger, but in the following fifteen minutes the beats fell to 14.

On the following day we repeated the experiment. The extract of hemanthus reduced the beats from 55 to 24, and weakened them. After the application of the solution of atropia the beats continued to grow less frequent, and in twenty minutes had fallen to 14. The atropia appeared to exercise little or no influence on the strength of the contractions; perhaps they were a little stronger, though if so the improvement was scarcely manifest.

ACTION ON MAN.

A man swallowed a grain of the alkaloid hemanthia, which produced only slight dryness of the mouth, so that this experiment would indicate that on man hemanthia is far less powerful

than atropia. We shall see presently that the reverse is the case as regards cats.

A man took a grain of the extract every half hour for six doses and then four hourly doses. The only apparent effect was dryness of the mouth, causing him to drink very frequently.

Next day, May 2d, the same man took twelve grains in five hours, which produced more dryness of the mouth and thirst, with rather free perspiration, and he said he passed more water than usual.

On May 3d, after taking thirty-three grains of extract in three hours and a half, he complained of great dryness of the mouth and parched lips. The lips looked very dry, and to the touch the tongue felt a little dry. He was very thirsty. At the end of three hours, when he had taken twenty-nine grains of extract, his hands were slightly moist. He passed, he said, a very large quantity of water ; indeed he had to urinate nearly every half hour. He filled two utensils with urine. The increased urine was not due to the thirst, for he was not allowed any drink while this experiment was going on. This large dose neither dilated his pupils nor caused headache, and, indeed, produced no symptoms other than those mentioned.

On May 5th he took 50 grains of extract, which produced only dryness of the mouth with increased flow of urine, as the following table shows :

Hour.	Quantity of Urine.	Took Medicine.	Amount.
11 to 12	2 oz.		
12 to 1	$1\frac{1}{2}$ oz.	Dinner at 12:30, P. M.	
1 to 2	3 oz.	2 P.M.	gr. 5
2 to 3	$2\frac{1}{2}$ oz.	2:30	"
3 to 4	2 oz.	3	"
4 to 5	4 oz.	3:30	"
5 to 6	6 oz.	4	"
6 to 7	4 oz.	4:30	"
7 to 8	4 oz.	5	"
		5:30	"
		6	"
		6:30	"

He passed, therefore, in the first three hours $6\frac{1}{2}$ oz., and $22\frac{1}{2}$ oz. in the six hours during which he took hemanthus ; that is to say, the medicine nearly doubled the quantity of urine ; and if we exclude the first two hours after commencing the medicine

when its diuretic effect had probably scarcely begun, we find the drug rather more than doubled the quantity of urine.

The increase in the urine was certainly not due to increased drink from thirst, except at dinner, for the patient had taken no fluid, and then only his usual quantity.

These experiments on man, therefore, show that hemanthus dries the mouth and increases the urinary secretion ; and we may here state that each of the cats we experimented on passed water freely. The effect on the skin secretion is doubtful, for this man, always a free secreter, perspired during each of these experiments. Hence, if hemanthus does check perspiration it manifests this property in a weaker degree than its influence on the salivary secretion.

A man received a grain of nitrate of hemanthia hypodermically. In about half an hour this dried the mouth, produced faintness and the patient became childish or idiotic. These symptoms lasted about half an hour.

Another man received the same dose which induced the same symptoms, but in this instance the drug produced greater weakness, so that he could scarcely move a limb or raise his head from the pillow. He perspired freely. Symptoms lasted about half an hour.

In these observations with the alkaloid given hypodermically, the pupil and pulse remained unaffected.

Mr. Gerrard prepared for us a one in twenty solution of the sulphate of hemanthia.

Mr. W. H. Neale tested its action on the pupil of eleven persons, applying in each instance a single drop to the eye.

He finds that the alkaloid dilates the pupil quickly and widely, but the dilatation soon passes off; on the average in five and a half hours.

The results of Mr. Neale's observations is shown in the following table :

	Dilatation begun in	Amount of Dilatation.	Dilatation lasted
	15 minutes.	widely dilated.	5 hours.
	20 minutes.	"	7 hours.
	25 minutes.*	slightly.	5 hours.
	15 minutes.	widely.	6 hours.
	15 minutes.	"	7 hours.
	15 minutes.	"	6 hours.
	25 minutes.	moderately.	5 hours.
	15 minutes.	"	7 hours.
	15 minutes.	"	5 hours.
	15 minutes.	widely.	5 hours.
	25 minutes.	moderately.	4 hours.
Average.	18 minutes.	.	5.6 hours.

*Only a part of the solution entered the eye.

Summary of conclusions :

In warm-blooded animals hemanthus causes drowsiness, general weakness, tremors and tetaniform startings, impaired sensibility, dilatation of the pupils, dimness of vision, dryness of the mouth, hurried and shallow breathing, nausea and sickness.

In frogs it causes paralysis and tetanus; and paralysis precedes tetanus.

Tetanus is due to the action of the poison on the spinal cord.

Paralysis is due chiefly to the action of the poison on the spinal cord.

Hemanthus paralyzes, in a slight degree, the motor nerves and muscles.

Hemanthus paralyzes the vagus and the intra-cardiac inhibitory apparatus.

It slows and weakens the heart of frogs.

It antagonizes the action of extract of muscaria.

Atropia does not antagonize the effects of hemanthus on the frog's heart.

In man it produces general weakness, delirium, dryness of the mouth, increased urinary secretion ; topically applied it dilates the pupil.

The action of this amaryllidaceous plant, hemanthus tox-
icarius, corresponds very closely, if, indeed, its behavior be
not identical with that of the alkaloid from the common
Daffodil (Narcissus), a member of the same order. In
warm-blooded animals both dilate the pupil, whether ad-
ministered internally or topically applied. Both dry the
mouth, produce general weakness, tetaniform twitchings,
nausea, sickness and hurried breathing.

Both antagonize the action of extract of muscaria on the
frog's heart.

Hemanthia, however, acts, like narcissia, only when it is
obtained from the bulbs of the plant when in flower. The
action of this alkaloid derived from the bulbs a few weeks
or months after flowering differs singularly from the action
of the alkaloid just referred to. This alkaloid extracted
after flowering causes salivation, contracts the pupil when
internally administered and slightly dilates it only when
topically applied.

The action both of narcissia and hemanthia is in many re-
spects similar to that of atropia, which also dilates the
pupil when internally administered and especially when top-
ically applied, dries the mouth, produces weakness, drowsi-
ness, tetaniform twitching in warm-blooded animals, well-
marked tetanus in frogs, nausea and vomiting; in cats,
hurried breathing, accelerated pulse.

Dr. Fraser has shown that atropia produces tetanus in
warm-blooded animals, and we were anxious to ascertain
how far the effects of hemanthia and narcissia correspond
to those of atropia; we therefore administered some
atropia hypodermically to a cat, and produced exactly the
same tetaniform twitching as that which follows the ad-
ministration of narcissia or hemanthia.

We administered sulphate of atropia hypodermically to the same
cat to which we had given extract of hemanthus toxicarius to as-
certain to what extent the effects of these two drugs are alike. Dur-

ing two hours we administered ⅞ of a grain of sulphate of atropia, in seven injections of gr. ⅛. The first dose ⅛ gr., produced weakness, drowsiness, dilatation of pupils and dry mouth. When the animal had received ⅞ grain, these symptoms did not increase, but on tapping the back elicited slight twitching. Next day we injected, at first two grains, which produced sleepiness and slight twitching, twenty minutes afterward we injected another grain which increased the twitchings, though the animal could still walk. 134 minutes from the first injection, we gave another grain, making four in all ; this dose produced drowsiness, much general weakness, tremors and tetanic startings induced by tapping the back, or pinching the skin, or by loud noises : in fact, the same symptoms which follow the injection of extract of hemanthus.

Whilst hemanthia and atropia have many properties in common, yet they differ from each other in the following respects. Hemanthia affects first and chiefly the brain and spinal cord, and in a less degree the salivary secretion and the pupil ; for a moderate dose causes drowsiness, weakness and tetanic twitchings, whilst the mouth becomes only slightly dry and the pupil moderately dilated, but a larger dose dilates the pupil widely and makes the mouth very dry ; on the other hand, a moderate dose of atropia widely dilates the pupil, makes the mouth quite dry, and enduces slight drowsiness, but weakness and tetanic twitching come on only when a very large dose, as four grains, is given hypodermically. As far as cats are concerned, hemanthia is a far more powerful alkaloid than atropia. Mr. Gerrard calculates that the extract of hemanthus yields 1¾ p. c. of alkaloid. Twenty and twenty-seven grains of this extract equal therefore to between ¼ and ½ grain of alkaloid produced symptons as decided as those induced by four grains of sulphate of atropia.

It is interesting to observe that whilst the members of the solanaceous order possess many properties in common, yet in certain members some of these properties, as the foregoing pages exemplify, are reversed.

The same remark holds with regard to some of the amaryllids.

Thus atropia, hemanthia, narcissia from the flowery bulbs whether topically applied or taken by the the stomach, dilate the pupil and arrest most secretions. The remaining number, narcissia from bulbs when flowering is over, pituria, nicotine, affect the pupil differently ; narcissia contracting the pupil when given internally and only slightly dilating it when topically applied; pituria contracting the pupil when internally administered, but dilating it when topically applied, whilst nicotine, whether it is given by the mouth or topically applied, contracts the pupil ; moreover all these plants increase most of the secretions.

This summary shows the respective properties of Solanaceous and Amaryllidaceous plants.

Atropia dilates the pupil, dries the mouth, produces general weakness, tetaniform starting in cats, well marked tetanus in frogs, impaired sensibility, drowsiness, nausea and vomiting (cats), hurried breathing, accelerated pulse.

It paralyzes the motor nerves, their terminations first ; it paralyzes the spinal cord, and the extra- and intra-cardiac inhibitory apparatus.

It affects but slightly the voluntary muscles.

Hemanthia dilates the pupil, dries the mouth, produces general weakness, tetaniform startings in cats, well marked tetanus in frogs, impaired sensibility ; it causes drowsiness, nausea and vomiting, hurried breathing.

It paralyzes the cord and probably the motor nerves, and produces a very slight effect on the voluntary muscles.

Narcissia from flowering bulbs, whether applied externally or given internally, dilates the pupil, dries the mouth, produces general weakness, slight twitchings and startings, drowsiness, nausea and retching, accelerated pulse.

Narcisssia after flowering is over, internally slightly contracts pupils, topically applied dilates pupil, but not

strongly. It produces copious salivation, probably increases cutaneous secretion, general weakness, strong muscular and tetaniform twitchings, nausea and sickness, drowsiness, hurried breathing, slight acceleration of pulse.

Pituria locally applied dilates the pupil, internally administered contracts and in very large doses (as in cats), dilates the pupil, salivates, sweats, produces general weakness, strong tetanic twitchings, drowsiness, nausea and vomiting, hurried breathing.

Nicotine administered internally or applied topically, contracts the pupil; given internally in very large doses it dilates the pupil, it salivates and sweats, and produces general weakness, strong tetanic twitchings, and stiffening of the extremities on walking or running, well marked tetanus in frogs, nausea and sickness, hurried breathing, accelerated and weak pulse. It paralyzes the motor nerves, their terminations first, it next paralyzes spinal cord; and produces no effect on voluntary muscle.

Each of these alkaloids produces general weakness, tetaniform startings, and several produce tetanus in frogs. They cause drowsiness, nausea and vomiting, hurried breathing and accelerated pulse. Nicotine in one respect is an exception to this statement, for it does not apparently produce drowsiness. At all events the symptom is not noticed in papers treating of the action of nicotine, and in one observation we made on a cat drowsiness was certainly absent.

We may point out that those substances which have been investigated concerning their influence on the nervous and muscular system all correspond in their physiological action; thus atropia, hemanthia and nicotine paralyze the spinal cord and motor nerves but leave the voluntary muscles unaffected.

Some writers believe that pituria and nicotine are identical. We are inclined to think that whilst very closely

allied they are not identical, for we find that pituria
topically applied dilates the pupil, whilst Kröker (quoted in
Wood's therapeutics,) finds that nicotine topically applied
contracts the pupil. Moreover, we find that nicotine pro-
duces in cats far less tetanic twitchings than pituria, but
other observers appear to have obtained from nicotine
a greater degree of tetanic twitchings than we met with.
We find that nicotine produces that peculiar stiffness of
the limbs seen when the cat walks or runs, which is so
marked after pituria. In our experiment it occurred with-
out any tetanic twitchings on tapping the cat's back or
other part.

We draw attention to the fact that the drugs hitherto in-
vestigated that affect the pupil also modify secretion. The
following table is arranged to exemplify the action of these
drugs on the pupil :

Pupil dilators in-ternally or topically applied.	Given internally, contract: topically applied, dilate.	Given internally, contracts; topically, first contracts for short time, then di-lates.	Pupil contractors internally or topic-ally applied.
Atropia.	Muscarin.	Narcissia, (from bulbs af-ter flowering has ceased). Pituria. Gelsemia, (salivates cats.)	Physostigmia.
Hyoscyamia,			Pilocarpia.
Daturia.			Nicotine.
Duboisia			Opium.
Narcissia (from flowering bulbs).			
Hemanthia.			
Conium ? ? ?			

All those substances which dilate the pupil, whether
used internally or topically, are arresters of most of the
secretions. Those substances which contract the pupil·
whether used internally or topically, increase most of the
secretions.

There is a curious intermediate group the action of which when administered internally differs from its action when topically applied. The members of this group increase most of the secretions. Should further investigations confirm these conclusions, it appears that the influence of the internal administration of a drug on the pupil is a better indication of its effect on secretion than the topical application of the same drug. The foregoing table illustrates this fact.

It may be objected that opium, a contractor of the pupil, increases only the skin secretion whilst it checks other secretions, being in fact more an exception to than a corroboration of the rule we are attempting to establish. This no doubt is true and obliges us to modify our general conclusions.

With the exception of opium and its alkaloids all the substances in the preceding tables act probably directly on nervous structures in or near the eye, whilst opium probably affects the pupil through some part of the central nervous system; for, opium excepted, these substances when topically applied to the eye, all powerfully affect the pupil, and indeed thus applied affect it most readily and markedly. The topical effect corresponds to that induced by a very large dose given internally. The topical employment of opium on the other hand produces little or no effect, though the pupil becomes contracted when opium is given by the stomach. Therefore our general statement must run thus: That the action of a drug capable of affecting the pupil, through an intra-ocular nervous apparatus, affords an indication of the effect of the same agent on secretion.

In the preceding table we have not included picrotoxine, which Luchsinger has shown increases the cutaneous, salivary and lachrymal secretion, and we find too increases the salivary secretion. The effect of picrotoxine on the pupil does not appear to be satisfactorily determined.

The Husemanns, in their *Pflanzenstoffe*, say that it often contracts the pupils, which become dilated at the close of the poisoning.

If this statement is correct then picrotoxine conforms to the rule we have suggested. We have tested the local application of picrotoxine with a saturated solution, about 1 in 150 parts of water in large quantities, and frequently repeated to the eye, but without affecting it in any way.

ON THE USE OF THE COLD PACK FOLLOWED BY MASSAGE IN THE TREATMENT OF ANÆMIA.

By MARY PUTNAM JACOBI, M. D. and VICTORIA A. WHITE, M. D.

I WAS led to use the cold pack in the treatment of spanæmia from the belief that it would tend to increase the rapidity of tissue metamorphosis ; this would be expected to indirectly increase assimilation, and therefore promote absorption of nutritive material from the digestive canal. To test the correctness of this hypothesis, I analyzed the urine elaborated during the pack and passed immediately after, and compared its composition with that of urine excreted during other portions of the same day. The first conspicuous result of these analyses, was the demonstration of a marked increase in the elimination of urea during the hours of the pack. From this fact I at first inferred that my hypothesis was justified, and that the characteristic effect of the pack was to accelerate tissue metamorphosis—to increase waste and the products of oxidation — thus indirectly promoting assimilation. But closer examination of the facts showed that this conclusion was too general, and that the real influence of the pack both permitted and demanded a more minute analysis.

I regret very much that circumstances prevented me from combining these analyses of urine with the analysis of the blood by means of the hematimetre. This will be done in another series of cases. In these, the modifications of

the anæmic condition were estimated by the ordinary clinical tests.

When the urine was analyzed, the urea was estimated by Liebig's volumetric tests. In two clinical and two experimental cases, the analysis of the urine was carried farther, and a quantitative estimate obtained of the inorganic salts and of the organic material other than urea, including uric acid, and the substances sometimes classed together as "Extractive." The method for obtaining the quantitative estimate of the latter, was adapted from Neubauer and Vogel, pp. 149, 150.*

In the three final cases no examination of urine was made, but the cases are recorded for the sake of the clinical results.

CASE 1.—Miss A. B., æt. 21, first seen May 8. 1878. Then in a profoundly anæmic condition ; weighed only 78 lbs., and was so feeble that she could with great difficulty mount the stairs, or even walk on level ground. The anæmia seemed to have initiated in repeated attacks of malarial fever. At first, menstruation had been very profuse, and recurred every three weeks ; this, doubtless, contributing to the anæmia in which the menorrhagia origin-

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* The entire weight of the solid constituents of the urine was first calculated from the specific gravity carried out to four decimal points. The above calculation is for 1,000 c.c.—from it a calculation is easily made for 10 c.c.—The amount of urea in 10 c.c. of urine was then ascertained by Liebig's test. Another specimen of 10 c.c. was evaporated to dryness over a water-bath in a small, accurately-weighed, fine porcelain capsule with a close cover. This capsule was then placed on a triangle and heated until all the organic matter of its contents had been completely carbonized. Boiling water was then poured upon the contents of the capsule, allowed to stand a little while and then filtered off through a weighed filter ; and this process repeated (the same filter always being used) until the carbonaceous mass was entirely freed from the soluble salts. The filter was then returned to the capsule—the latter covered, and with its contents cautiously raised to red heat—when the entire carbonaceous mass was consumed and disappeared. To the same capsule was now returned the solution of salts ; this evaporated to dryness—the residue heated to red heat for a moment—the capsule cooled over sulphuric acid and weighed. After deducting the weight of the capsule and of the ashes of the filter previously estimated, we thus obtained the weight of inorganic salts in 10 c.c. of urea.

This weight was deducted from the total amount of solids calculated from the specific gravity ; the residue was the organic matter in 10 c.c. From this was again deducted the amount of urea estimated volumetrically ; the residue was the extractive.

These amounts thus ascertained for 10 c.c. were calculated for the whole amount of urine analyzed.

ated.   For eleven months there had been complete amenorrhœa.
The patient had suffered for years from constipation, but during
the last year this had become excessive ; on account of it the pa-
tient had been several times treated by drastic purgatives, with
the effect of making her condition worse.   For about nine months
the constipation had been complicated with a "membranous
colitis."   There were frequent discharges of the characteristic
mucous membrane from the bowels ; on one occasion, after a
colocynth pill, this membrane was tubular, and measured three-
fourths of a yard.   Associated with this was marked tenderness
on pressure over the left end of the transverse colon and over the
entire descending colon.   The anorexia was extreme.   There was
much sleeplessness and nervous irritability ; a good deal of spinal
tenderness to pressure existed.   There was absence of respiratory
murmur, prolonged expiration and dulness at the apex of the left
lung.

The treatment was at first directed toward the relief of the ob-
stinate constipation and (probably) passive hyperæmia of the colon.
The patient was directed to take cold water enemata, from 2 quarts
to a gallon in quantity daily.   A grain of tartrate of iron and potassa
was given every hour, together with minute doses of powdered
ipecac.   To avoid irritation of the intestine and to secure nour-
ishment by stomach absorption, the patient was placed upon milk
diet and soups, containing a fixed quantity of Leube's extract.
Of this, during the first fortnight, she only took a tablespoonful a
day, together with one quart of milk.

On June 11th there was already considerable improvement.
The enemata procured regular evacuations, in which were only
shreds of mucus.   The tenderness over the colon, also that on
the spine, was quite gone ; the sleep was much better.   On this
day, while insisting on an increase in the food, the cold pack was
first ordered, together with entire rest in bed.   The pack was to
be taken every other day, to last an hour, and to be followed by
massage.   The patient was to be enveloped first in the wet sheet,
this surrounded by a dry one, and that by six blankets, the whole
drawn tightly around her body.

As the patient lived at some distance, the massage was perform-
ed by a woman procured from a bathing establishment, and, as I
had reason subsequently to believe, the rubbing was quite inef-
fectually administered.   The benefit derived from the combined
treatment was therefore much more attributable to the pack.

On June 22d the patient reported that she was always very much

tired on the day of the pack, but "felt splendidly" the next day.
At this date was taking two quarts of milk besides the Leube's ex-
tract, and felt a desire for ordinary food, as she had not done for
18 months. Weighed 84 lbs.—gain of 6 lbs. since beginning of
treatment, and of 2½ lbs. in the week following the pack and rest
in bed.

The patient stayed in bed for three months from June 11th, re-
ceiving the packs every other day, and continuing the rest of the
treatment, upon whose details it is not necessary to dwell.

Mixed diet was resumed on July 4th, but after an attack of
diarrhœa a temporary return was made to the milk. The cold
water enemata were replaced by enemata of lime water.

On September 9th, patient still required enemata, and there was
occasionally some mucus in the stools, but she announced herself as
feeling "perfectly well." Had a good appetite, slept well, had no
pains. Weighed 93 pounds, face full and colored. At this time
perspired freely in packs. From this date packs and rest in bed
were given up, enemata replaced by small doses of tamar indien,
the iron and ipecac continued. The improvement in strength was
so rapid that in a short time the patient could walk several miles.
Menstruation recurred a year later. The patient has continued
not only well, but to her own view, robust—certainly active, rosy,
and stout enough for her age. The induration or collapse at the
apex of the right lung entirely disappeared.

In this severe case the complexity of the treatment adopted
makes it a little difficult to estimate the precise share attributable
to the pack. The prolonged rest in bed might by some persons
be credited with the largest share in the recovery, since the essay
of Weir Mitchell has so widely popularized the idea of rest in the
treatment of anæmia. I think myself however, that this rest was
of the least consequence in the case. The girl never had been
overworked in any way, hence the etiology of her anæmia was
entirely different from those in which rest is so beneficial ; more-
over, owing to her great debility, this patient had been in a state
of nearly complete repose for two or three months before I saw
her, from incapacity to choose otherwise. Yet her condition
steadily deteriorated ; she was wasting away from slow starvation.

In regard to the massage, I have reason to believe that it was
not energetic enough to effect the muscles ; its influence was prob-
ably confined to the skin. The iron was unquestionably of im-
portance ; but, before the course of treatment above indicated,
the patient had frequently taken iron without benefit. Finally

the enemata may be supposed to have powerfully affected the circulation of the intestine, and to have acted synergistically with the cold pack in promoting absorption.

CASE 2.—Miss C. D., young lady of 25, profound anæmia with amenorrhœa, obstinate constipation, resisting purgatives, as podophyllin and castor oil, which were often employed. Two years before the first consultation, patient had had an attack of scarlatina. After this, failed to menstruate for six months, then menstruated throughout the winter for another period of six months, then the menstruation ceased again and had been absent for a year. Associated with the obstinate constipation, was atonic dyspepsia ; and as a result of both the anæmia, and of the digestive disturbances it caused, the patient suffered from abundant acne simplex, which covered the face with comedones.

She was ordered to take a grain of tartate of iron and potassa every hour : daily enemeta of two quarts of cold water each : diet of milk and Leube's extract, and the cold pack followed by massage every day. As a further corrective of the intestinal anæmia, belladonna tincture was given, gtts. v every three hours.

The patient soon found that the combination of iron and belladonna, when taken with the large enemata, sufficed to obviate the constipation ; but that either of the three remedies alone, was quite insufficient. The treatment was begun about October 1, 1878.

On December 20th, reported considerable improvement. The amount of food had not exceeded one quart of milk and nine tablespoonsful of Leube's extract a day ; but this seemed to be sufficient, at least for the conscious wants of the patient. There was no more distress after eating, nor pain in the stomach or bowels. The acne had improved, the face was less swollen, less blackened with comedones, of which there were, however, still an undesirable abundance. The patient at the beginning of the treatment had been thin ; but now, although feeling stronger, had become still thinner. The treatment was continued, but the enemata were reduced to a pint, which was now found to be sufficent, while the belladonna and iron were taken regularly. Meat was allowed once a day. On June 12, 1879, reported again. While above régime was followed strictly, remained quite free from dyspepsia, with the least variation from it however, food lay heavy and undigested in the stomach. The acne had nearly disappeared.

The patient went to Europe in this month, and stayed until

November. During this time all treatment was interrupted. Far from benefitting from the journey, she suffered throughout intensely from dyspepsia, and had several severe hysterical attacks. In January of the present year came to New York again for systematic treatment. Cod liver oil was now added to the iron and belladonna. The cold packs were resumed, with massage much more energetic than she had previously been able to obtain in her own home. On being removed from the pack, each part of the body was rubbed with cold salt water previous to massage. After the pack and massage would always feel " furiously hungry." An effort was now made for the first time to reëstablish menstruation by means of local irritation of the endometrium. For this purpose, at first, the anode of a galvanic battery was carried to the fundus of the uterus, and held there for a few minutes while a current was passed, just perceptible to the hand of the patient grasping the cathode. This application was repeated every day for a week, causing each time, a slight oozing of blood, such as was never caused by the simple introduction of a steel dilator. A month later, the general treatment having been continued, with marked benefit to both dyspeptic and hysterical symptoms, an application of iodine to the endometrium was substituted for the positive current of electricity. On the day following this application a menstrual flow set in, for the first time in three years, and lasted abundantly for four or five days. The patient was feeling extremely well and able to eat an ordinary mixed diet. She then returned to her home, with directions to continue the general treatment, and to return to New York for the local applications in case the menstruation failed to return spontaneously. In due time she wrote to say that it had done so.

As in the first case the treatment adopted was complex. The hydrotherapic treatment was reënforced by the administration of cod liver oil during the last and most successful months and by the local irritation of the endometrium, which seemed to be the immediate antecedent of menstruation.

In regard to the iron however, the patient had made abundant trial of it before coming to me, but had never seemed to derive any benefit from it ; dreaded it as tending to increase the constipation.

The hourly administration of small doses of iron, with a view to saturating the hematoblasts,* was suggested to me

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* Term given by Hayem to young, imperfectly developed corpuscles, not yet supplied with a normal amount of hæmoglobin.

by the well-known success of an analogous method in diph-
theria, where the iron seems to act by averting a fatal im-
poverishment of the blood in its corpuscles.

In Case 3, the treatment was simpler, but followed by
rapid and even surprising success.

Miss E. F., æt. 16. Intense anæmia, with loud venous humming :
pallor of skin and mucous membranes, various points of myalgia
and of spinal tenderness ; anorexia, great debility, constant head-
ache, sleeplessness. First menstruation had appeared a year pre-
vious to date, then once again, four months later, since then there
had been complete amenorrhœa. The patient was ordered a grain
of tartrate of iron and potassa every hour, a cold pack and vigorous
massage every day.

She reacted very well in the packs from the beginning ; per-
spiring in an hour and a-half, an unusual circumstance with these
profoundly anæmic patients. At the end of a week, there was
already marked improvement, much less headache, some return
of appetite and of strength ; sleep sound and refreshing, pains
gone. At the end of a month, patient menstruated spontaneously.
The double treatment was continued for a month longer, then the
packs were interrupted, the iron continued. The patient has since
remained perfectly well, during a period of six months.

In Case 3 the urine was analyzed for urea, partially be-
fore and after the pack.

CASE 4.—Miss G. H., æt. 35, anæmia of long standing, general.
and also markedly cerebral, resulting in violent headaches. Much
spinal tenderness existed. This patient had been much over-
worked, and in accordance with the indication furnished by this
etiology, she was kept in bed during the duration of treatment,
which lasted about six weeks and consisted exclusively in packs
and massage. The patient's capacity for bearing the packs was
very irregular, so that their mode of administration was obliged to
be varied. Sometimes, instead of receiving a cold pack, she was,
previous to the massage, enveloped in blankets for an hour and
then sponged off with cold water.

During the first week the patient received the cold pack for an
hour daily, at the end of this time there was some increase of ap-
petite, and the spinal tenderness was much diminished. The
estimations of urea were through some misunderstanding only be-

gun on the seventh day of the treatment, (December 28th), then, as seen by reference to Table I, the amount of urine was increased, the amount of urea lessened. From this date however, the daily elimination of urea rose for a week, up to the day of mentruation when the packs were interrupted. This rise was associated with an increase in the amount of urine, but not exactly proportionate. (See Table I, January 3d to 9th.) The urea scarcely fell until the occurrence of a violent headache, on the the third day of menstruation, interfering with ingestion of food.

Cold pack was resumed on January 15th, and then for the first time, the urine was collected just after the pack, (the bladder having been emptied immediately before it), and its composition compared with that of urine excreted at other hours of the same day. Reference to Table I, (January 15th), will show:

1st. That the amount of urea eliminated both after the cold and after the blanket packs exceeded the hourly amount of an average day without treatment. (Compare December 21st.)

CASE IV.—TABLE I.

Date.	Form of Pack.	Amt. urine in oz.	Amt. urea in grms.	Per hour, Urine.	Per hour, urea.
Dec. 21st	Before treatment.	35	19.404		.808
" 28th	Day including pack.	56	15.719		
Jan. 3d	" " "	36	19.678		
" 4th	" " "	50	24.375		
" 5th	" " "	46	24.144		
" 7th	" " "	49	23.887		
" 8th	" " "	58	24.559		
" 9th	Menstruation, interrupting pack.	60	22.160		
" 10th	"	41	23.622		
" 11th	"	48	24.514		
" 12th	Headache for 24 hours	48	15.046		
" 14th	Headache continues,	50	21.421		
" 15th	Cold pack 1 hour, then blankets 2 hours.		4.5132		1.4995 [cold pack]
" 24th	For entire day incl. pack.		18.730		1.506 [blankets] 0.677 [rest of day]
	Blanket pack then, cold sponging 3 hours		4.284		1.714—
" 25th	For entire day,		24.528		0.964 [rest of day]
	Blanket pack and cold sponging 3 hours.		3.058		1.019
" 26th	For entire day,		32.563		1.405 [rest of day]
	Blanket pack and cold sponging 3 hours.		3.187		1.062
" 29th	For entire day,		25.153		1.046 [rest of day]
	Blanket pack and cold sponging 3 hours.		3.058		1.019
" 30th	For entire day,		19.795		0.797 [rest of day]
	Blanket pack and cold sponging 3 hours.		1.512		0.504
Feb. 7th	For entire day,		17.850		0.778 [rest of day]
	Partial [abd.] cold pack 3 hours.		4.136		1.375
" 9th	For entire day.		18.479		0.683 [rest of day]
	Partial pack 2 hours.		2.068		1.034
	For entire day.		16.324		0.648 [rest of day]

2d. That the hourly amount for the rest of the day fell below this average amount, but only about one-fifth as much as the excess was above it.

3d. That the hourly amounts of urea eliminated during the cold and the blanket packs, were sensibly the same.

The patient continued to improve until the 24th, when she felt unusually well. A blanket pack, followed by sponging, was then substituted for the cold pack, in which she did not react sufficiently.

The 24th, day of maximum *bien être*, was also the day of maximum elimination of urea. On the 25th the amount of urea diminished after the pack was diminished ; that for the rest of the day was increased, so that the amount during the two periods approximated. This approximation continued during the following days until the 29th, and, coincidently, the patient ceased to feel so well ; had more headache, less appetite.

On the 30th (see table) the urea eliminated during the pack fell even below that for the rest of the day ; in other words, the patient *ceased to respond, by the characteristic phenomenon, to the pack.*

On the following day intense headache and nausea developed in the pack, which was therefore interrupted. On the same day menstruation recurred.

This was the first case in which it was made evident that *the diminution of urea during the hours following the packs is as important an element of reaction as is the increased elimination during the pack*. Any alteration of this sequence is followed by symptoms of malaise, of which the deviation from rule may be the cause of the consequence.

After menstruation, treatment was resumed by means of the partial pack, *i.e.*, the wet sheet was wound around the trunk of the patient only. The table (Feb. 7th and 9th) shows that increased excretion of urea still occurs; but the increase is not as marked as with the full pack when reaction is well established.

At this point the treatment was obliged to be interrupted, as the patient left the city. At the time of leaving she did not feel as well as in the middle of January, and about a fortnight later she wrote that she " began to feel the bene-

fit of the treatment." That is to say, returning to precisely the same set of conditions as she had been among previously, she found herself decidedly stronger, with less headache and backache and more appetite.

As regards the immediate effects of the packs, may be noticed :

1st. The highest elimination of urea took place, not during a cold pack, as we had expected, but during a blanket pack, followed by simple cold sponging (1.703 grms. per hour, Jan. 24th).

2d. The next highest elimination was on the *first day* of the general cold pack (1.499 grms., Jan. 15). The patient being then placed in blankets for two hours, the amount of urea per hour was almost the same (1.506 grms).

3d. The third highest elimination is on Feb. 8th, *first day* of partial cold pack (1.300 grms).

4th. After a few days of either method in this patient, the amount of urea eliminated during the pack falls, and at the same time various symptoms of *malaise* occur, often beginning in the pack, and continuing to increase, sometimes to violence, after it.

5th. The influence of headache in reducing the elimination of urea seemed to depend on the anorexia, sometimes absolute, which accompanied the headache, and prevented the patient from eating for many hours.

The examinations for urea in this case, and the more complete analysis of the urine made later, were first done by myself, afterwards by my friend, Dr. V. A. White, who submitted to a special preparation for the work.

CASE 5.—Mrs. J. K., an anæmic woman, æt. 41, with moderate sub-involution of the uterus (canal measures 8½ cm.). But possibly from some areolar hyperplasia, still more from the general anæmia, there had been absence of menstrual flow for two or three years, this being replaced by slightly sanguinolent leucorrhœal discharge at the menstrual epoch. This was preceded for a week

by feeling of general nervous distress, and said to be attended by sufficient prostration to keep patient in bed for three days. The anæmia seemed to have originated in profuse lactation. Multiple vaso-motor disturbances, chills, flushes, ringing in ears, etc. Frequent diarrhœa, attended from time to time with discharges of membrane (membranous colitis, as in Case 1); appetite fair.

The packs and massage were recommended for the anæmia, and to equalize the abdominal circulation. Large cold enemata were ordered for the colitis; dialyzed iron every three hours—Koumyss—General faradization at menstrual period as a stimulant.

This patient was never able to bear the prolonged cold pack. In 15 minutes she began to be cold, and if the pack was maintained remained cold in it, and chilly throughout the day.

This peculiarity seemed to be connected with the chronic hyperæmia of the colon. This morbid condition is so far analogous to the physiological states of digestion and of menstruation: that with the dilatation of a large section of abdominal blood-vessels, the dilatation of cutaneous blood-vessels, necessary for reaction to the cold pack, is rendered

CASE V.—TABLE II.

Urea on five days without treatment of 1st month.

Date.	Amount in grms.	per. ct.	Amt. per hour in grms.	Amt. urine per hour in c. c.	
Oct. 7th	23.76	3.3	0.990	30.00	
" 8th	24.60	3.5	1.025	30. 0	
" 13th	22.88	2.6	0.953	37.66	average urea per hour = 1.011
" 17th	19.00	2.	0.791	39.58	
" 20th	31.20	2.6	1.300	56.00	
Total	121.44		5.011		

Urea on five days without treatment of 2d month.

Date.	Amount in grms.	per ct.	Amt. per hour in grms.	Amt. urine per hour in c. c.	
Nov. 1st	24.576	2.5	1.024	42.699	
" 3d	30.819	2.5	1.284	51.574	
" 10th	29.614	2.4	1.234	51.433	average urea per hour = 1.272
" 12th	37.208	3.2	1.550	48.449	
" 19th	30.546	2.4	1.272	53.032	
Total	152.763		6.364		

Urea of 24 hours including pack and massage.

Date.	Amount in grms.	per ct.	Amt. per hour in grms.	Amt. urine per hour in c. c.	
Oct. 11th " 24th Nov. 5th " 8th	20.00 28.157 31.180 26.532	2.5 2.2	0.833 1.192 1.299 0.110	33.33 50.41 52.577 48.42	average per hour amt. 0.856
Nov. 13th	6.648	2.5	1.899	75.97	urea after blanket pack and massage 3½ hours.
" 14th " 15th	5.961 6.695	1.7 2.8	1.987 2.202	116.895 78.640	5 mins. cold, then blanket and massage, Average 3 hours =2.029
" 18th	1.92	2.4	1.92	80.00	massage 1 hour with- out pack.
Oct. 31st	¾ hour urine 1.68	2.4	2.24	70.00	Faradiz. ½ hour dur- ing menstruation.
Nov. 22d	⅝ hour. 1.955	2.3	1.564	85.00	Average per hour =1.023
" 23d	For 2½ hours. 3.60	3.	0.144	120.00	
" 26th	For 2½ hours. 3.10	3.1	0.154	100.00	
Total					

Urea after pack 20 minutes—massage to 1½ hours.

Date.	Amount in grms.	per ct.	Amt. per hour in grms.	Amt. urine per hour in c. c.	
Nov. 4th (Before see N. 3d)	3.406	1. (2.5)	2.27 (1.284)	227.170 (51.574)	
Nov. 5th (Before pack)	3.22	2.3 2.7	1.84 (1.165)	80.00 (43.148)	
Nov. 7th	2.40	1.2	1.600	133.32	
Nov. 8th (Before pack) (After pack)	1.28	2.5 1.1	(1.091) 1.32	(43.68) 120.00	Average urea per hour =1.928
Nov. 10th (Before pack) Nov. 11th (After pack)	3.92	2.4 1.4	(1.272) 2.613	55.032 186.66	
Total for hours of pack.			9.643		

difficult or impossible. On one occasion only was the patient in the pack three-quarters of an hour : on all others the pack only lasted fifteen or twenty minutes,—or finally, toward the close of the term of treatment, only five min-utes, and was then followed by a blanket pack. The cold salt water sponging or slapping, and the massage, followed during an hour as usual.

The urine was only analyzed for urea, but it may be in-teresting to compare the percentage and amount of this under the several different sets of conditions indicated.

The summary of Table II shows :

1st. Although the cold pack, when given, only lasted ten to twenty minutes, the increase in the amount of urine and of urea eliminated during the hour and a half which in-cluded this pack and massage, was as decided as in the cases where the pack lasted one to two hours.

2d. The same increase was observed after a warm blanket pack followed by massage. The increase was most marked when this blanket pack had been preceded by five minutes cold pack. On this day (November 14th) the amount of urea per hour was higher (2.202) than on any day but two of the hours of packs (November 4th, 2.27 gms.; November 11th, 2.613). But it is noticeable that after the cold pack the amount of urine was very much increased, (227.170 c.c., November 4th ; 186.66 c.c., November 11th), so that the per-centage of urea was low, (one per cent.) while after the blanket pack of November 15th the amount of urine was much less, yet the amount of urea almost as high.

3d. An increased elimination of urea was observed after an hour of massage alone. Thus, 1.92 gms. on November 18th as compared with 1.272 gms. of November 19th, with-out treatment.

4th. On the first day of general faradization (October 31st) the elimination of urea during an hour was increased ; but the amount was not high on the subsequent days.

The average per hour for the four séances was less than for a similar period on days without treatment. This fact is interesting, as showing that cutaneous irritation alone, unless accompanied by some agency affecting the abdominal circulation, does not increase the elimination of urea.

5th. The estimate of averages is liable to be misleading, because the daily fluctuations in the elimination of urea are so great that it is only safe to compare the hours of the pack with the hours from the adjacent period, either just before or just after. Still it may be worth while to notice that on comparing the hourly elimination in periods of five days we find an average for:

Days without treatment, first month. Per Hour.	Days without treatment second month. Per hour.	Hours of packs in second month.
1.011	1.272	1.928

Thus the average confirmed the observation of individual days of treatment. The rise in the average elimination of urea in the second month, was associated with an increased consumption of food.

On the other hand, the average elimination of urea for an entire period of twenty-hours which included a pack, sank below that of the days on which no pack was given. (0.858 gms.) This observation is strikingly confirmed by another case. (See Table.) It shows that a movement of compensation takes place after the exaggerated diuresis caused by the pack, in virtue of which the elimination, perhaps also the formation of urea, is diminished.

Although this case resembled Case I in the co-existence of membranous colitis with intense anæmia, and a diminution in the menstrual flow that almost amounted to amenorrhœa, it differed from it in two important particulars.

1st. The relaxation of the blood-vessels seemed to be out of proportion to the deglobulization of the blood; and thus

this patient, though much less pallid, prostrated and starved than the other, suffered much more from headache, roaring in ears, and multiple vaso-motor disturbances.

2d. Perhaps in connection with this fact, the membranous discharges from the colon were accompanied by an habitual tendency to diarrhœa, while in the first existed most intense constipation. From the irritability of the colon, the case was not very well suited to the cold packs. After seven or eight of these had been given during a period of two weeks, and the patient had been eliminating about two grammes of urea during the hour of pack, she began to wake up in the morning early, with a feeling of chilliness, which was shortly followed by a large loose passage from the bowels. This made her feel quite sick and faint.

Thus the pack seemed to confirm the existing morbid tendency to passive dilatation of the abdominal blood-vessels, and was on this account abandoned.* Could the patient have been induced to persevere systematically with the cold enemata, (which invariably arrested the diarrhœa, membranous discharges and pain accompanying them), until the hyperæmia of the colon was removed, there is reason to think that much might have been accomplished by a subsequent hydro-therapic treatment.

As it was, at the end of six weeks, the patient was somewhat improved. The membranous diarrhœa had ceased, and with it the dragging pains in abdomen and hips. More particularly, a menstrual flow had occurred for the first time in four or five years, and the patient, instead of remaining confined to her bed or room, went about as usual at the menstrual period. The packs were then interrupted, the other treatment continued with further results, not important to record here.

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* In very anæmic women, with vasor-motor neuroses dependent on anæmia rather than on hysteria, I have several times observed the often daily occurence of one or two large passages, attended by a feeling of giddiness and great prostration. The phenomenon evidently repeats Goltz' experiment of paralyzing the splanchnic nerve.

The case is principally noted for the sake of comparing the eliminations of urea with those of other and more favorable cases.

CASE 6.—Mrs. L. M., æt. 24. Is too complex to be related in detail. The profound anæmia of the patient was complicated by the effects of a marked anteflexion of the uterus, with chronic hyperæmia of the endometrium, for which local condition local treatment was instituted. The cold packs were given principally on account of the anorexia, which had existed for years, and which had kept the patient in a state of chronic inanition. After the cold packs and massage, she felt for the first time, an appetite ; was able to eat, and for a week or two at a time, would be relieved of the nausea which had become almost habitual with her. Table III, gives the analysis of urine as regards urea, for four packs. The patient reacted very well in these. As in Table I, it is seen that the amount of urine is very much increased ; and the increase in the elimination of urea is in proportion to this. The great total increase of urea on February 26th, was associated with an increase in the amount of food taken, principally milk.

CASE VI.—TABLE III.

Date.	Form of pack.	Amt. urine in c. c.	Per cent. urea.	Amt. urea.	Urea per hour.	Amt. urine per hour.
Feb. 19th	Pack and mass. 2 hours.	177.144	1.8	3.188	1.594	88.572
" 20th	Before pack.	590.48	2.6	15.352	0.877	33.74
" 20th	After pack.	295.24	1.8	5.314	2.961	117.00
Feb. 24th	After pack.	265.716	1.3	3.454	1.973	151.20
" 26th	24 hours without pack.	177.144	2.3	40.743	1.697	73.81
" 26th	After pack.	177.144	1.7	3.011	2.011	118.09

CASE 7.—Miss N. O., a young lady æt. 21, suffering from chloro-anæmia of moderate severity, but complicated by severe trigeminal neuralgia, and also by spasmodic dysmenorrhœa. The latter condition was associated with some chronic hyperæmia of the endometrium, causing stricture of the internal os ; otherwise no uterine disease. The patient had been treated for months by iron, and also by the most approved remedies for the neuralgia. In summer, when in the country, would seem to derive great benefit from the iron ; in the winter " ran down " again completely. The stomach was very irritable, and frequent attacks of gastric

catarrh increased the headache and debility of which the patient complained.

The iron and phosphorus which the patient had been taking was continued, and on March 31st, the hydrotherapic treatment began. The urine was analyzed much more completely than in the other cases, as shown by Table IV. The packs were always enjoyed from the beginning ; the patient reacted well, growing warm, though not perspiring. At the end of the first week, she already felt decidedly stronger. On April 12th, reported herself as having been remarkably free from neuralgia, notwithstanding the occurrence of some moral excitement, such as would usually bring it on. On April 26th, the tenderness on pressure, formerly constant over the supra-orbital nerves, had quite disappeared, though some tenderness remained over the supra-maxillary. On May 27th had had no neuralgia for three weeks, and announced herself as "feeling splendidly." In the interval, a sponge tent had been introduced into the uterus to dilate the os ; and the following menstrual period had passed with scarcely any pain. On June 1st, the patient went out West for the summer.

The Table IV relating to this case, has been drawn up with a great deal of care, and we think an analysis of its data will repay perusal.

Calculating the averages per hour from this Table IV, we have : In hours outside of packs and massage, calculated in five days. (March 31st, April 3d, 8th, 10th, 12th.)

Urea.	Extractive.	Inorganic salts.
0.971.	0.432.	0.341.

For the five days adjoining, in hours of pack. (March 31st, April 2d, 7th, 9th, 11th.)

Urea.	Extractive.	Inorganic salts.
1.295.	0.347.	0.511.

Thus a decided increase in the urea, a slighter increase in the inorganic salts, a diminution in the extractive.

In the second month of treatment, (see Table II), the averages per hour for the time outside of packs, were :

Urea.	Extractive.	Inorganic salts.
1.309.	0.803.	0.653.

For the hours of packs.

Urea.	Extractive.	Inorganic salts.
1.405.	0.685.	0.554.

CASE VII.—TABLE IV.

First Month		Amount in c. c.	Solids in grms	Inorganic	Urea	Extractive	Per cent. urea	Per hour urea	Per hour Inorganic	Per hour Extractive	Per hour Amount
March 31st . .	Before pack: 21 hours	472.384	28.066	3.779	14.643	9.644	3	0.681	0.175	0.448	21.97
	After pack: 3 hrs.	73.81	4.299	0.885	2.435	0.979	0.974	0.974	0.354	0.393	29.52
April 3d . . .	Before pack	516.67	34.914	9.226	19.633	6.055	3.7	0.968	0.439	0.288	24.60
	After pack	180.00	5.87	1.08	3.60	1.191	2	1.20	0.36	0.397	60.00
April 7th . .	After pack	172.00	6.812	1.978	4.30	0.534	2.5	1.433	0.659	0.178	57.00
April 8th . .	Before next pack	531.432	34.67	6.111	20.194	8.365	3.6	0.96	0.291	0.398	25.306
April 9th . .	After pack	125.000	6.116	1.50	3.50	1.116	2.8	1.40	0.60	0.446	50.00
April 10th . .	Before next pack	509.289	30.852	5.85	19.352	5.65	3.8	1.018	0.307	0.297	26.805
April 11th . .	After pack	195.000	6.815	1.462	4.290	1.063	2.2	1.70	0.584	0.322	78.00
April 12th . .	Before next pack 22½ hrs.	767.624	50.079	11.130	27.634	11.315	3.6	1.288	0.494	1.731	34.11
April 16th . .	After pack	115.000	5.459	0.862	3.22	1.377	2.8	1.288	1.839	0.551	46.00
April 17th . .	Before next pack	546.194	33.088	6.554	19.662	6.872	3.6	1.062	0.354	0.372	29.52
April 18th . .	No pack 1 hr. massage 21 hours	797.148	49.219	9.167	27.800	12.252	3.5	1.309	0.436	0.598	37.959
April 19th . . Not warm for an hour	After pack 3 hours	118.000	7.010	1.239	3.894	1.877	3.3	1.298	0.413	0.625	39.35
April 21st . .	After warm pack 2 hours	118.000	Influ 5.773	enza 1.652	3.068	1.053	2.6	1.534	0.826	0.526	59.00
April 22d . .	Before next pack	546.194			22.847		Influence of cold 4.00	1.038			24.863
	After cold pack	140.000	7.013	1.82	3.920	1.273	2.8	1.568	0.748	0.489	56.00
April 23d . .	Before next pack	560.956	35.943	8.414	21.316	6.213	3.8	1.121	1.449	0.328	29.524
April 25th . .	After pack 1¾ hours	90	4.927	1.080	2.70	1.147	3	1.542	0.617	0.656	51.00
April 26th . . 1 day	Before next pack Day bef. men.	472 384	31.368	6.377	17.005	7.986	3.6	0.944	0.354	0.444	26.243

Total for 24 hours	Urea	Inorganic	Organic	Totals for 3 days		
				Urea	Inorganic	Organic
March 31st	17.078	4.664	10.623	31st to 8th	31st to 8th	31st to 8th
April 3d	23.233	10.306	7.246	64.805	23.059	26.768
April 7th—8th	24.494	8.089	8.899	9th to 17th	9th to 17th	9th to 17th
April 9th—10th	22.852	7.35	6.766	77.658	27.358	27.302
April 11th—12th	31.924	12.592	12.378	18th to 23d	21st to 26th	21st to 26th
April 16th—17th	22.822	7.416	8.249	82.845	28.097	30.743
April 18th—19th	31.694	10.406	14.129			
April 21st–22d	25.915					
April 23d	25.236	19.234	7.486			
April 26th day bef. menst.	19.705	7.457	9.133			

There is still therefore an increase in the average of the urea, but it is less than in the first month, apparently because the general average elimination of urea is increased. The elimination of extractive and of inorganic material is absolutely increased for the hours of pack, and it is even more increased during the other hours, so that on this month the hours of pack show in this respect an inferiority.

As already noted, the calculation of averages in the solid constituents of the urine is misleading. The best estimate of the effect of the pack, is obtained by comparing the quantity and composition of the urine eliminated during and after them.

During the first month uniformly, and during the second with only two exceptions, the amount of urea during the packs was increased.

The elimination of organic matters other than urea, (estimated by the method described in the footnote to p 297) generally rose and fell with the urea. On the 7th and 9th of April, however, the rule was reversed, and the elimination during the packs was much less than during the rest of the day.

As compared with the amount of urea the amount of other organic matter was not uniform in either direct or inverse proportion.

Generally speaking, however, the amount of organic matter rose and fell with that of the urea, standing to it in the proportion of from $1 \cdot 2$ to $1 : 3$. In one case during the hours of the pack, when the amount of urea was unusually large, (4.30 grms., April 7th.) the amount of organic matter was unusually small—0.534 grms. or only ⅛th. In another case—in the hours before the pack—when the amount of urea was unusually small, 14.643 grms (March 3d) the amount of organic matter was unusually large, 9.644 grms., a proportion of $1 : 1.5$.

The elimination per hour of inorganic salts was generally increased during the pack. On April 3d, however, the amount after the pack was slightly below the amount per hour in the period preceding it—although on this day the elimination of urea and of organic matter followed the usual rule.—Also on the 8th when the patient received massage without the pack—the amount of inorganic material was a trifle higher than during the next pack.

The total amount of solid material eliminated in the urine in twenty-four hours, whether urea—extractive or inorganic matter — was apparently not changed by the treatment. The amount of urea remained constantly rather low (see Table IV). Estimated in periods of three days taken from the post menstrual intermenstrual and premenstrual week—the sum followed the law which we have elsewhere demonstrated for the menstrual cycle.* The amount was lowest in the post menstrual week (64.805 grms.) rose in the intermenstrual week (77.658 grms.) and was highest in the premenstrual week (82.845 grms.) On the day before menstruation, as we have often observed in persons who suffer from dysmenorrhea, the amount suddenly fell to a lower point (19.715 grms.) than on any day in the month, except on the first day of the post menstrual period; the extractive, however, rose.

There is finally one observation most important when taken in connection with the fact that during the two or three hours of the pack the absolute amount of solid materials in the urine was increased. This is a second fact—that the total amount of urine was increased during this same period; often almost doubled — while the per cent. of urea was, comparatively, decreased, often as much as 1 per cent. (see Table I). On this account we should infer that during the pack the increased elimination of urea was due to the

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*Question of Rest for Women.

increased elimination of water which carried off by the kidneys a large proportion of excrementitious material.

The observations carried on during the second month on the same patient (see Table V) corresponded in all respects to the preceding. The packs were recommenced immediately after menstruation, but the analyses of urine were not made until the second week—the 13th of May. It is noticeable that in this month, when the patient was feeling remarkably well, the amount of urea and also of inorganic material during the premenstrual week was increased.

CASE VII.—TABLE V.

Date.	Second Month.	Amt. urine in C.C.	Solids in Grms.	Inorg.	Urea.	Extractive.	Per cent. Med.	Per hour Urea.	Per hour Inorg.	Per hour Extract.	Per hour amt.
May 13	After pack, 3 hours,	206.668	5.297	1.55	3.366	0.441	1.6	1.102	0.516	0.147	68.889
" 14	Before next pack, 19 hours.	782.386	36.459	3.911	20.342	12.206	2.6	1.070	0.205	0.643	41.179
" 16	After pack 2 hours,	132.858	7.738	1.129	2.391	4.218	1.8	1.195	0.564	1.61	66.429
" 17	Before next pack, 19 hours, ...	826.672	40.449	11.573	23.146	5.730	2 8	1.218	1.461	0.243	43.509
" 19	After pack, 2½ hours,	221.43	8.772	1.992	4.867	1.913	2.2	1.946	0.767	0.865	88.57
" 20*	Before next pack, 18 hours, ...	974.292	51.077	10.717	29.928	11.132	3.0	1.623	0.565	0.619	54.127
" 22	No pack nor massage, 15 hours, ...	442.860	30.955	5.313	19.728	5.714	4.5	1.328	0.354	1.709	29.524
" 23	After pack, 2¼ hours. Just precedes menst.	55.00	3.46	0.77	2.20	0.49	4.0	0.977	0.342	0.118	28.00

* Feeling splendidly.

Total for 24 hours.	Urea.	Inorganic.	Organic.	Totals for three days before menst.		
				Urea.	Inorg.	Organ.
13 to 14	23.648	5.461	12.647	88.760	31.494	29.197
16 to 17	25.537	12.702	9.948			
19 to 20	34.095	12.709	13.045			
22 to 23	21.928	6.083	6.204			

CASE VIII.—TABLE VI.

Date		Amount in c. c.	Amt. in grms.	Inorganic	Urea	Other organic	Per cent. urea	Per hour urea	Per hour inorganic	Per hour organic	Per hour amount
June 23d . .	Before first pack	925	29.095	8.325	18.500	2.270	2	0.804	0.362	0.903	40.22
June 24th .	After pack 2 hours	120	2.656	0.600	2.041	0.016	1.7	1.02	0.30	0.008	60.00
June 25th .	Before next pack	935	31.588	11.687	18.70	1.201	2	0.85	0.551	0.904	42.50
June 26th .	After pack 2 hours	95	3.984	1.520	2.28	2.464	2.4	1.14	0.76	0.092	47.50
June 27th .	Before next pack	560.956	22.219		19.072		3 4	1.03			30.32
June 28th .	After pack	50			1.50		3	0.75			25.00
July 1st . .	Before pack	442.86	15.477		9.742		2.2	0.463			21.08
	After pack	50	2.679		1.55		3.1	0.620			20.00
July 5th . .	Before pack	501.908	17.541	3.513	9.536	4.492	1.9	0.433	0.159	0.204	22.859
July 6th . .	After pack	50	22.130	0.615	1.200	0.398	2.4	0.600	0.307	0.199	25.00
July 7th . .	Before next pack	472.384	29.134	5.668	11.437	12.029	2.4	0.519	0.257	1.067	21.472
July 8th . .	After pack	50	2.446	0.45	1.05	0.946	2.1	0.525	0.225	0.998	25.00
July 9th . .	Before next pack	575.718	16.097	5.181	11.514		2	0.548			27.415
July 10th .	After pack	45	1.886	0.495	1.125	0.266	2.5	0.562	0.247	0.133	22.50
July 11th .	Before next pack	708.576	38.44	8.512	17.125	1.61	2.4	0.778	0.386	0.851	32.208
July 11th .	After pack	50	2.33	0.70	1.15	0.48	1.4	0.575	0.35	0.24	25.00
July 14th . Day before menst.	Before pack	472.384	27.96	3.779	8.03	4.259	1.7	0.365	0.171	0.559	21.472
July 15th . Menst.	No pack. Massage 1 hr.	45	1.153	0.405	0.72	0.028	1.6	0.720	0.405	0.028	45
July 17th .	Bef. rubbing	339.526	15.03	3.395	9.846	1.789	2.9	0.447	1.154	0.081	15.433
July 18th .	Rubbing 1 hr.	55			1.32		2.4	1.32			55
July 20th . 1st day after July 21st . .	Before pack	869	12.896	2.952	7.759	2.195	2.1	0.352	0.132	0.099	16.61
	After pack 3 hours	162.382	4.161	1.461	2.598	0.102	1.6	0.866	.487	.034	54.127
July 22d . .	Before pack	649.528	24.967	7.794	16.238	.35	2.5	.738	.354	0.042	29.524
July 23d . .	After pack 3 hours	115	3.713	0.92	2.415	0.378	2.1	.805	0.316	0.126	38.33
July 25th . Visit to sea-shore	Before pack 15 hours	200	44.27	1.80	5.600	1.454	2.8	.373	0.12	0.090	13.33
July 25th .	After pack	130	2.877	0.664	2.08	0.133	1.6	0.693	0.221	0.044	43.33
July 28th .	Before pack	305	14.923	2.460	9.453	2.728	3.1	.429	0.111		13.86
July 29th .	After pack	150	2.097	0.600	1.50		1	.500	.20		30.00

CASE 8.—Mrs. P. J., a young married woman, æt. 22. First seen seven weeks after her first confinement. This was said to have lasted during three days. The perineum had been ruptured. On the third week, when patient first got up from bed, she was attacked with pain, chills and fever ; was obliged to return to bed, and remained there for two weeks. Two weeks later, at the time of my examination, the patient was extremely weak and pale, unable to stand or walk, with almost absolute anorexia. The fundus of the uterus was within two fingers breadth of the umbilicus. A slight thickening in the left cul-de-sac indicated a recent perimetritis.

The treatment was directed toward the general anæmia and toward the uterine subinvolution, principally the latter. Iron and nerve tonics were for the present postponed. The patient received f ℥ ss of ext. ergot. fld. every four hours ; vaginal injections at first of salt water, afterward of tannin, and a daily cold pack, at first of one, then of two hour's duration, followed by an hour's massage.

Table VI gives the result of the examination of the urine under these conditions during a period of five weeks. This table is at once seen to differ in one particular from the tables of Case 7. The amount of urine eliminated during the hours of pack and massage is by no means always in excess of that eliminated during the same period of time in the rest of the day ; and when there is an excess this is much more variable in amount. Thus on four occasions (June 28th, July 1st, 10th and 11th) the amount of urine per hour during the pack was less than the average by $\frac{1}{2}$, $\frac{1}{5}$, $\frac{1}{4}$ and $\frac{1}{3}$.. On the other hand, the excess which was noticed in the majority of cases (10), varied from $\frac{1}{8}$ of the average to $3\frac{1}{2}$ times that amount per hour ; and, what is very noticeable, on two of the days on which the excess was most considerable, being twice (July 14th) or more than three times (July 17th) as much as the average, the patient received no pack, but only massage during an hour.

On all the days in which the amount of urine eliminated during the pack was increased, the amount of urea at the same period was increased also (10 observations). The increase varied from a scarcely perceptible amount ($\frac{1}{56}$ on June 8th, $\frac{1}{39}$ on June 10th) to $\frac{1}{9}$, $\frac{1}{8}$, $\frac{1}{7}$, $\frac{1}{5}$, $\frac{1}{3}$ the amount of the average, or even double and three times as much when the amount of the urine was increased in this proportion.

Calculating the averages per hour in periods of five days, as for

Case 7, we find, for five days without packs (June 23d, 25th, July 5th, 7th, 11th) :

Urea.	Extractive.	Inorganic.
.676	0.785	.339

For adjoining days, hours of packs :

Urea.	Extractive.	Inorganic.
.772	0.307	.358

The diminution in the amount of extractive during the hours of the pack, as compared with the increase of urea, repeats an experience of Case 7. Comparing this fact again with another observation of Case 7, namely, the rise of extractive on the day before menstruation, coincidently with the fall of urea, we may draw the further inference that during the pack the increased elimination of urea is *not* alone due to the increased amount of urine, but that more organic material is converted into urea, leaving less for " other organic " or extractive. On the assumption that this conversion takes place in the liver, we may ascribe the increase to the increased circulation in this gland effected by means of the pack.

The rapid involution of the uterus, effected during the treatment, and also the large doses of ergot that this patient was taking, rendered the case somewhat peculiar. On July 26th, when the packs ceased, the uterus measured only 9 cm. It was to be presumed that during the treatment the fatty detritus from the diminishing uterus was circulating in the blood, perhaps acting as a diuretic. The ergot, on the other hand, tending to contract the abdominal vessels, should cause less water to pass through the kindeys ; or, in other words, the usual effect of the pack of increasing diuresis would be counteracted. I do not know precisely what was the relation of time between the administration of the ergot and the pack, but it is probable that one dose came very near to the time of the pack. During menstruation the ergot was suspended, and it is noticeable that it is on the two days of menstruation when massage was given, and.on the first day after menstruation when the pack was resumed, that the amount of urine was so greatly in excess of the average *for this* individual.

On August 2d the patient was sent to the seashore. She had regained her appetite, had lost all pelvic pains, was able to walk

up and down stairs, slept well, and felt, although not yet strong,
in pretty good condition.   On September 12th the uterine cavity
measured 8 cm.   It subsequently became completely normal, and
the patient, though of delicate appearance, entirely well.

I will now give briefly the record of three other cases,
both of which would seem at the outset as suitable for
hydrotherapic treatment as those described, but which
nevertheless received none, or only partial benefit from
them.

CASE 9.—Miss R. S., æt. 27.   Moderately anæmic, with con-
tinuous venous hum in jugular, but endowed with considerable
muscular strength, and excellent digestion.   A retroversion of
the uterus existed, producing, however, no local symptoms be-
yond an occasional moderate dysmenorrhœa.   The patient was
extremely small of stature, with a head, very well shaped, but
large, out of proportion to the height.   There were some traces
of infantile rachitis.   Whether as a result of this, or of the anæ-
mia, or of the long standing retroversion, the young lady had suf-
fered for years from nervous headaches, which, during the last two
years, since a great moral strain, had assumed exceptional severity.

Cold packs and massage, iron and cod-liver oil were recom-
mended for the anæmia, while the efficacy of various direct pal-
liatives was tried to relieve the headaches.   The uterus was re-
placed with a pessary.   The hydrotherapic treatment extended
over 22 days, with an interval caused by menstruation of six
days.   The analyses of the urine are recorded in Table VI.
Only urea, and occasionally phosphoric acid, was estimated.   As
in the other cases, the amount of urine during the packs was
greatly increased ; the percentage of urea lowered, but its abso-
lute amount increased.   That it was possible, in this patient, to
greatly increase the amount of urine, yet even lower the elimina-
tion of urea, is shown by the observation of June 17th, fourth
day of menstruation, when the amount of urine rose to 1040 c.c.,
yet the amount of urea was only 17.68 grms., or an hourly
amount of 0.735 grms.   Again, on the day of the first pack,
June 8th, the amount of urine was nearly one-third the amount
which had been passed in 20 hours, the amount of urea per hour
was about 1½ times as much (6.54).

On the 10th the increase was more than double (2.44) also on
the 12th.   On the 13th the average amount rose, on the pre-

CASE IX.—TABLE VI.

Date.	Amt. Urine in c. c.	Amt. Urea in grms.	Per cent. urea.	Per hour urea.	Per hour P O 5.	Per hour urine.
June 7th. 20 hours	600.00	15.	2.5	0.75	0.066	30.00
June 8th. 2¾ hours after pack	290.	3.19	1.1	1.16		105.00
June 9th. No pack	676.00	14.16	2.7	0.59	0.039	28.16
June 10th. 3 hours pack	480.00	4.32	0.9	1.44		160.00
June 11th. Entire day, including pack of 10th	880.00	17.32				32.50
3 hours pack	860.00	3.00	1.	1.20		120.00
June 12th. 20 hours before	600.00	13.20	2.2	0.66	0.48	30.00
3 hours pack	400.00	5.39	1.1	1.79		163.33
June 13th. 21 hours	915.00	21.045	2.3	1.052		45.70
3 hours pack		3.555		1.185		
June 14th. Menstrual	560.00	14.56	2.6	0.728	0.0448	
June 17th. 24 hours	1040.00	17.68	1.7	0.735		
June 18th.	920.00	19.32	2.1	0.805	0.0732	
June 19th.	885.00	20.355		1.017		
June 20th. 20 hours	610.00	15.25		0.762		
3 hours pack		3.30		1.10		
June 21st. 24 hours	580.00	18.56	3.2	1.773		
2½ hours pack	430.00	4.73	1.1	1.882		
June 26th. 20 hours		16.00		0.80	0.07	
2 hours pack	540.00	3.96	0.9	1.98	0.18	
June 29th. 20 hours		12.45		0.622		
3 hours pack, shower bath.	r25.00	1.875	1.5	0.625		41.66

menstrual day, thus approximating the amounts of the two periods. After the two first packs following menstruation, the increase of urea was in much smaller proportion ; on the last day the amount was identical with that of the 20 hours preceding, while on an intermediate day (June 26th) the amount was, as before, doubled, as also the amount of phosphoric acid.

Clinically speaking, the patient reacted very well in the packs, and during the first week, *i.e.*, that preceding menstruation, had less headache ; felt better. But during the last week of the treatment, had constant headache, loss of appetite, and rapid pulse (96). At this time, as noticed, the proportionate increase of urea diminished. These circumstances all corresponded with those already noticed in Case 1, also a patient suffering from severe neurasthenic headaches.

CASE 10.—Miss T. A., æt. 30, anæmic, but hysterical quite out of proportion to the anæmia. Principal complaint was of constant pain in the track of the right ilio-hypogastric nerves, without the least tenderness on pressure, either external, or internal in the ovarian region. The patient had no uterine or other local disease, but was profoundly preoccupied about herself, was indeed, a typical case of hysterical egotism. Whether on this account or not it is difficult to say, as the hydrotherapic treatment was complicated with others that might probably better have been omitted; but the patient, who, during the first month of treatment, improved, during the second became excessively fatigued after each pack, and at the close considered herself rather worse than better.

The urine analyses of this patient were, unfortunately, lost.

CASE 11.—Miss V. W., æt. 20, pure chloro-anæmia, uncomplicated by dyspepsia or muscular atony, or uterine disturbance. Patient formerly suffered from severe headaches, which had ceased for a year or two before the time of consultation. The muscular development of the patient was remarkably fine ; her appetite was good, and digestion excellent. She was, however, extremely pale, and suffered from a constant sense of fatigue and somnolence. Her blood corpuscles, counted by Hayem's hematimetre, numbered 3,689,000, but it is probable that the hæmoglobine was diminished out of proportion to the aglobulie.

The patient was ordered tartrate of iron and potassa, 3 grs. every three hours, Koumyss, rectal injections of blood, and the cold packs with massage. After a month of this treatment felt a great deal better, with much less fatigue and sleepiness. The patient

went into the country, and passed an excellent summer.   In October the debility began to return.   Former treatment resumed, minus the rectal injections of blood, to which the patient had a great objection.   But though persevered in for two months, no sensible improvement in the condition of the patient was observed.   On the contrary, she had several severe attacks of headache.

From this crucial experiment we must infer that the apparent benefit derived from the hydrotherapic treatment on the first occasion, was really due to the blood injections.   No analyses of the urine were made.

The general inferences to be drawn from these clinical experiments will be discussed in a later number of the ARCHIVES.

HYOSCYAMINE.

By J. C. SHAW, M.D.,

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I N volumes five and six (1875–6) of the West Riding
Asylum Reports, there appeared articles by Dr. Law-
son on the physiological and therapeutical uses of this drug.
Since that time several articles have appeared on its use,
but it is still very little known and used. In January, 1880,
a communication was made by me to the New York Thera-
peutical Society (committee on neurotics), on the use of
this alkaloid. Dr. E. C. Seguin also reported on this sub-
ject; this short paper is the basis of what was presented
then with the addition of observations since that time.
Hyoscyamine is the active principle of H. niger; two pre-
parations are to be found in this market, one a blackish
brown thick substance—the amorphous alkaloid; the other
the crystals in small white needle-like bodies; the most
reliable are those made by Merck, of Darmstadt.

In all the observations which we have made at the asy-
lum, the amorphous alkaloid of Merck has been used.

In acute and subacute mania, it is valuable as giving
periods of muscular rest and sleep to the patient, which
cannot be done so well by any other drug; it must not be
expected to keep the patient continually under the influ-
ence of the medicine; allow him to come well out of its
effect, and perhaps some hours of noise and motion per-

mitted before you give another dose, remembering that the drug is not curative, which few drugs are, but only palliative and therefore an aid to recovery. In epileptic mania, we have had excellent results in warding off maniacal attacks which last for weeks following epileptic fits ; one dose will prevent this state, it is to be followed by bromide of potassium, and my assistant Dr. Woodside, believes that under these circumstances, the bromide acts more promptly and efficaciously than it does when the hyoscyamine has not been given.

In cases of mania with or without delusions, where the patients are destructive, tearing up and breaking everything, and filthy in their habits, we have found decided benefit from a few repeated doses of $\frac{1}{4}$ to $\frac{1}{2}$ grain.

In cases of acute alcoholic mania with delusions it has the very best of effect. I have never used it in general paralysis; in cases of noisy dements and in chronic mania I have used it, but without any other result than to keep them quiet during the time they are under its influence. I prefer to occupy these patients with some light work.

I have in insanity seen no advantage in small repeated doses ; in fact, it does not do so well as in large doses acting profoundly. I am disposed to think that if any bad effect is to be produced by the drug, it is more apt to do so from small doses systematically given and for a long time, than from large doses given at long intervals.

In delirium tremens with decided hallucinations of vision and delusions which lead the patient to get out of bed and try to get out of the house, windows, etc., $\frac{1}{4}$ to $\frac{1}{2}$ grain given by the mouth has a rapid and complete effect, giving the patient quiet and sleep. This is a condition which in late years has been so generally treated with chloral hydrate, and which so often requires very large doses, and even then it frequently fails.

One of my former assistants, Dr. J. C. Lester, now at the Inebriates Home, Fort Hamilton, has had excellent results with this medicine in this class of cases.

In cases of paralysis agitans in which the tremor often becomes so distressing to the patient, great relief can be obtained by giving the medicine by the mouth, or hypodermically in small doses, $\frac{1}{24}$ to $\frac{1}{12}$ grain of the amorphous alkaloid or $\frac{1}{75}$ of the crystalized hyoscyamine hypodermically. In cases of this disease treated at my clinic for nervous diseases we have had most decided results in the way of alleviation.

Dr. E. C. Seguin reported to the New York Therapeutic Society, last January, cases of paralysis agitans and chronic adult chorea treated by the hypodermic and internal administration of hyoscyamine, and he considers it a most valuable and safe paralysing agent. It can be used day after day for months without other ill effect than an occasional biliousness. While it seems doubtful if the drug can cure these rebellious neuroses, yet the great relief obtained is beyond question, and the patients express themselves as very grateful. Dr. Seguin considers hyoscyamine as the only remedy which can, to his knowledge, completely suspend the tremor of paralysis agitans for several hours.

From numerous trials with this alkaloid my observations are in accord with those of Dr. Lawson. In hyoscyamine we have a valuable addition to our therapeutics. In mental and nervous diseases it is, however, not to be supposed that it is a specific for these disorders; it is vastly superior to chloral as a hypnotic. I have never known it to fail, although I believe it does occasionally. Chloral very often fails. It has also the great advantage over chloral in its certainty to paralyze the motor apparatus more or less according to the dose you give, and this is an effect you cannot get so well, easily and safely with any other drug.

Decided effects obtained by its use are in my estimation in no way dangerous, the patients soon passing out of the effect.

I am astonished at the statements made by Dr. Savage, and which are entirely contrary to my observation. I have seen no such difference between the crystallized and the amorphous alkaloid as he has found. I have seldom met a patient who had a dread of taking the medicine after taking the first dose. I have seen but one patient who vomited from the use of it, and that was a young woman. I have never had a patient refuse to eat, or lose his appetite from its use; in fact the reverse, patients who were refusing to take food begin to eat heartily under its use. The medicine must be given with some judgment, and not repeated too frequently. In the treatment of melancholia I have seen no good effect, but I certainly have seen no harm. It might easily be predicted that in a condition like melancholia it could not be expected to do good; it would be just as reasonable to give it to a paralyzed man to restore his paralyzed members. Dr. Lawson speaks of hematemesis having been produced by it. This state it has not been my misfortune to meet with. I have met a case in which, after a complete trial, no permanent good effects were obtained. This patient also shows how tolerant patients may become of the medicine; this is also another reason why a remedy of this kind ought not—cannot be continued for a long time. In my experience the drug has acted rapidly in every case, and I am at a loss to account for the length of time Dr. Savage claims that it took to gain an effect in his cases. We have found that, on an average, in from 15 to 30 minutes after it is given by the stomach, the physiological effect is obtained. I never saw a case that was not quiet in an hour after its use.

The dryness of the fauces and the arrest of the salivary secretion, which are so often spoken of, have been in my ex

perience very slight, and not at all troublesome. In fact, in those cases that screamed incessantly, and in which we always have more or less dryness of throat and fauces, under the use of this drug we did not have it; I have never seen it interfere with the appetite. Good effect may be expected from the use of this alkaloid wherever excessive abnormal muscular action is present. It may also be used as a hypnotic, other drugs failing.

The following is a brief summary of cases illustrating its use. Acute and subacute mania are the conditions in which I first tried it as a remedial agent; the continued motion of these patients, incessant talking, screaming and singing, and want of sleep, soon renders the patient hoarse and exhausted.

CASE 1.—Female, aged 34, German, admitted December 4, 1879. Certificates of lunacy state that she has delusion of persecution; makes attempts to injure herself and others. The following history is obtained : She is married; had one child nine years ago; has been insane two months; previously enjoyed good health; has worked very hard; it is not known if she have any neurotic family history; is of temperate habits, and has lived harmoniously with her husband. Her menses ceased two months ago, just at the time of beginning of attack. Has never been insane before; is in poor physical health, sleepless and noisy; moves about continually, talking in a loud voice, and incoherently; will not answer questions or converse; begins to menstruate.

December 6th.—Grows gradually more and more noisy.

December 8th.—She climbs upon a window-sill, and throws herself off on to the floor; strikes other patients; will not eat, and has to be fed.

December 9th.—For the first time is given ½ grain hyoscyamine at 12 M. She is very soon quite quiet; the medicine has a profound effect upon her. At 3 P.M. she was fast asleep; respiration deep, and the cheeks were puffed out at each expiration; pupils dilated. She was aroused and fed with the tube at 8 P.M. She went to sleep just after it, and remained sleeping until 2 A.M., when she again became noisy and talkative; wets herself.

December 10th, at 10.30 A.M., was fed with tube and given ½ grain. By 12 she was quiet; she ate a hearty supper that evening.

December 11th.—She slept all night, and is quiet this morning, but gradually becomes noisy again in the forenoon; is given ½ grain, and she sleeps the greater portion of the day. She ate her dinner, but would not eat her supper; ½ grain has such a profound effect upon her that we reduced the dose to ¼ grain. As soon as the patient comes from under the influence of the drug she is again noisy and destructive, throws herself about and removes her clothing.

Since December 14th has eaten of her own accord; ¼ grain given each day until December 30th. During this time she has gradually improved.

With this patient chloral had no effect.

CASE 2.—P. M., aged 36, male, intemperate, second attack, admitted November 8th.

Certificates state that he declares that he is the Supreme Being, that the Virgin Mary is his wife and mother. When admitted he is very noisy, shouting at the top of his voice, clapping his hands, walking about incessantly, and acting in a very demonstrative manner; is incoherent, talks about religion, the priests and Virgin Mary in a rambling way; has been suffering from sleeplessness; was given ½ grain hyoscyamine, which quieted him in about fifteen minutes, and he slept most of the night.

November 12th and 13th.—Patient has taken ½ grain night and morning, during the time he was under the influence of the medicine he was quiet, but as soon as he comes from under its effects he is again noisy; the effect lasts from twelve to twenty-four hours.

November 14th.—The medicine has been gradually losing its effect upon him; to-day he is very noisy, talking continually, getting in and out of bed and throwing the clothing off him, smashing every thing in the room, becoming hoarse from continued talking; tongue moist but saliva thick; gave him one grain H. In one hour after he was quite quiet, lying in bed; he was able to speak but not distinctly, pupils partially dilated, he was not inclined to sleep but disinclined to talk, he was unable to stand up alone, he slept most of the night, but in the morning smeared his excrements over the room. As I desire to keep him continuously under the influence of the drug he is given ½ grain in the morning and ½ grain at night; he is quite quiet, but talks incoherently, eats well.

November 17th.—Gave ½ grain this A.M., he sits in a stupid quiet manner on the main hall, pupils widely dilated, he is becoming more tolerant of the medicine, and the effect passes off more rapidly ; one grain is given at bed time, he slept. It is unnecessary to go into the daily record of this case, the dose of medicine had to be increased as the effect became more and more transient, until on December 2d, he took at 8 A.M. four grains at a dose, the effect passed off so rapidly that at 3 P.M. he was again given four grains more, by 7 P.M. he was again noisy, the effect of the medicine had become so passing and its hypnotic effect seemed to have been lost. he simply kept quiet and did not sleep under these large doses as he did formerly under the much smaller ones ; as it was requiring so much, eight grains in one day to produce an effect, I determined to stop for a time at least until this tolerance should have passed off, during this time his pupils have been widely dilated and he has remained just as incoherent, he has also passed large quantities of pale urine, the examination of which showed nothing pathological ; as soon as these large doses were discontinued, this excessive secretion of urine ceased ; patient will in the midst of his noise stop and ask quietly and sensibly for what he wishes, or to speak to me in short answers to questions put to him.

December 10th.—In the afternoon he becomes wildly maniacal, shouting at the top of his voice, and gesticulating with all his might ; he believes that he is holding communications with George Washington and other deceased celebrities ; his excitement has become so much greater since we stopped the use of the hyoscyamine, and the inefficiency of other drugs in his case, and the most decided impairment of his physical condition which is taking place from his continued noise and sleeplessness, are reasons on which I again decided to give the hyoscyamine. So on December 11th, eight days after the last doses were given, we gave him one grain at 3 P.M., which in half an hour produced its marked physiological effects.

December 12th.—He is given ½ grain in the morning and ½ grain in the evening.

The doses were again gradually increased as the effect became lost, until December 29th, when he has been taking for the past two days three grains twice a day, and has become as tolerant of the drug as he was the first time, it is therefore discontinued. Soon after he began to take it the second time his physical condition improved, and his appetite was good. The medicine kept him quiet most of the time.

January 3d.—He has again grown quite noisy and hoarse from continued shouting.

CASE 3.—Male, age —. Epileptic for years ; for past few years his epilepsy has been followed by a maniacal condition which has sometimes lasted a week, and never less than three or four days ; he shouts at the top of his voice praises to God, and sings hymns ; this very maniacal condition comes on about a day after the fit. Bromide and chloral have been given him at the beginning of these maniacal attacks to try and stop them, but it has never accomplished much. Three days ago he had a fit, the next day it was evident that his mania is beginning, and I decide to give him hyoscyamia to try and stop it. At 10.50 A.M. pulse 112, but not full or bounding ; tongue coated ; mouth full of thick saliva ; face flushed ; pupils normal ; he is much excited ; speaks in a very loud tone of voice ; carries a bible around with him ; talks sensibly, but is disposed to talk about religion and hymns ; is very demonstrative in his manner. One-half grain H. is given him ; in fifteen minutes he let his book fall and became quiet ; at 11.20 A.M. he is unable to stand, and can sit up no longer ; at 11.40 is lying on the floor sleeping soundly, pulse 88, increased reflex action, pupils slightly dilated ; he sleeps until 5 P.M., when he is aroused and takes some supper ; at 6 P.M. goes to bed, is unable to walk steadily and has to be helped ; sleeps all night and is quite quiet the next morning, and in the afternoon is sent back to the quiet hall. This is one of the best results I have had.

CASE 4.—Male, aged 50, admitted November 8, 1878. Was insane for six months twenty years ago. Is destructive, tearing up all his clothing, as well as the sheets and blankets on other patients beds ; he would tear pieces of wood off the windows and doors, bite and tear the woodwork and clothing with his teeth, spit all over the walls, kick other patients ; tore up his bedding every night, and smeared his fæces all over the room.

On June 10, 1870, we gave him 1 grain hyoscyamine. In half an hour after he was under the full influence of the drug ; pupils dilated, could not walk steadily, staggered very much, and appeared weak ; tried to pick up little things off the floor. but could not ; he would topple over to one side when he tried to stoop down ; appeared to be quite conscious that there was something the matter with him. When told by some of the attendants that he was drunk he would laugh (he was always a most good-natured patient). At last he could not stand up any longer, and lay down

on the floor and went fast asleep for many hours.   He was given ½ grain each day for the next three days, after which it was stopped, and he has remained since the last dose an orderly, quiet man ; has given up his destructive and dirty habits.

Since this case was reported to the Therapeutical Society the patient has entirely recovered and left the asylum.

These cases are perhaps sufficient to illustrate the use of the medicine.

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AN UNIQUE CASE OF CONJUNCTIVAL LUPUS.*

By E. S. PECK.

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THE following details of an interesting case of lupus of the conjunctiva are elaborated from my note-book :

Paulina B., 9 years of age, born in New York of Polish parents, came to the Eye and Ear Department of the Eastern Dispensary May 24, 1879, presenting an ulcer of the superior lid of the left eye, whose external end lay at the external canthal angle of the eye, and whose internal end and inferior margin coincided with its tarsal border. The ulcer was ovoid, 7 mm. long, 3 mm. broad, had a granular floor coated with a clean, white secretion, and a well-defined, somewhat irregular wall; ulcer was not sensitive to touch, but easily bled on probing. Conjunctiva and globe of eye were not implicated; vision was perfect; and the parts were free from pain. Patient was in robust health, and showed no cachexia. As the child came alone, no history was obtainable, other than that the sore had existed two months. A diagnosis of ulcus rodens was made, and a solution of liq. chlori applied. Later in the month, the ulcer was thoroughly burned with the fused probe of nitrate of silver.

In June, the cauterization was repeated, and the chlorine water continued; the ulcer filled up, and cicatrized with a clean, whitish scar. In this ulcer the integument and lid-margin alone were involved; the cilia, as will be seen by the accompanying figs. I and II were destroyed, the region of epilation accurately corresponding to the limits of the ulcer at the tarsal border.

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* Candidate's paper read at the New York Pathological Society April 28, 1880.

July 28th.—Two months after the first observation, a new ulcer developed itself, lying at the middle part of the same upper lid, and having similar characters, but whose dimensions were somewhat longer than the primal sore. The latter is healed by a sound atrophic scar. The diagnosis is not easy, and suggests the possibility of multiple, or successive chancroid ; syphilis ; lupus ; eczema ; herpes tonsurans ; psoriasis vulgaris ; and epithelioma. Bichloride of mercury, gr. $\frac{1}{20}$, and cod-liver oil are given three times a day, and the nitrate of silver probe is renewed. This treatment is pursued for several weeks, during which time the integumental part of the ulcer cicatrizes, as with the first sore, but without a loss of cilia. The erosion passes over the tarsal margin, involving the palpebral conjunctiva to the same extent as the integument.

Early in September this second ulcer is entirely healed ; the integumental part by a clean, flat cicatrix, the conjunctival by more or less granulation-tissue and epithelium. No distinct knots were observable on the mucous surface ; it bore the character of un-

FIG. I.   FIG. II.

even papilliform granulation-tissue, whose interspaces gradually filled up to the common level. Both surfaces were scraped with Hebra's spoon ; the microscopic appearances of the products were negative, either when freshly examined, or after treatment with dilute alcohol and oil of cloves. The great abundance of pus corpuscles was noticeable.

In October, or five months after the patient first came under observation, a third ulcer appeared at the internal canthus, wholly conjunctival, and chiefly involving the palpebral conjunctiva of the upper lid. It will be observed that this ulcer, like the second, did not appear until after the complete cicatrization of the latter. Its progress was more rapid than that of the first two. The diagnosis of lupus exulcerans had been made by the attendant, which, however, was not the concurrent opinion of the dispensary staff, to whose various members the unique case was repeatedly submitted.

The rapidity of growth of this third ulcer militated strongly against this diagnosis, but it was accounted for by the anatomical angle of conjunctiva at this point.

The disease attacked first the palpebral conjunctiva of the upper lid at its most internal part, speedily extended to a corresponding part of conjunctiva of the lower lid, and very soon unroofed, so to speak, the inferior canaliculus, so that the latter was a groove, and no longer a canal. Early in November the ulcer had gone over upon the integument, presenting as in the conjunctiva, the same ovoid form ; the integumental part was larger than the latter, running coincident with the inferior tarsal margin to the extent of 9 mm., while it had a breadth of 7 mm. at its widest part. The same well-defined, somewhat irregular edge, granular floor, and greyish purulent secretion characterized it. It was twice thoroughly scraped to bleeding, and upon cessation of the hæmorrhage was neatly and thoroughly touched with fuming nitric acid, and dressed with resin ointment. Early in October, on the supposition of lupus, the general treatment was that of a scrofuloderma, and consisted of cod-liver oil, syrup of iodides of lime and iron, iodide of potash in large doses, and milk. Each application of the acid was followed by a marked contraction of tissue ; when the child's face began to look anæmic, the iodide of potash was removed from the formula.

November 12th, the child was sent to my friend, Dr. Bulkley, who presented her at one of his Wednesday afternoon lectures at the New York Hospital. The diagnosis of Lupus was confirmed, and advice given to treat the ulcers as pure scrofuloderms. Dr. B. called attention to the prominent feature of the case, viz., the rapidity of repair in each successive ulcer, which is not a feature of lupus. To the above formula glycerine was added. The accompanying sketch, Fig. I, was made Dec. 5th, and shows the amount of repair in the three divisions of the ulcer, viz., the palpebral conjunctiva of both upper (*a*) and lower (*b*) lids in the vicinity of the internal canthus, and in the integument (*c*) of the lower lid at the same point. The first division of the ulcer is represented as granulating ; the canthal angle is undermined, and the so-called tendo oculi, (*d*) attached to the nasal process of the superior maxillary bone, may be brought into view by stretching the lids ; the palpebral conjunctiva of the lower lid is granulating, while the less rapid cicatrization of the integument of the lower lid cannot be so well represented. In December and January 1880, the same treatment was pursued, but its details are not so well followed by the child as before.

No further caustic application is made, and the child passed from observation until April 3d, when the previous tripartite ulcer was entirely healed with loss of tissue at the margin, and of cilia at the inner extremity of the lid.   At that time a long, narrow, spindle-shaped ulcer occupied the palpebral conjunctiva of the lower lid, the cilia at the corresponding margin being preserved, and in good position.   Its characters, as to wall, base, and secretion, were macroscopically identical with those of its predecessors.

At present writing, April 24th, the child presents herself, after three weeks of entire self-neglect, with an irregular ulcer of the conjunctiva and margin of the lower lid, evidently an uniform enlargement of the last, narrow, spindle-shaped ulcer ; the granular efflorescences look like knots, secrete pus, and are accompanied by a total loss of cilia for quite three-fourths of an inch, and by marked hypertrophy of the lid and vicinity.   Fig. II is an accurate representation of this fourth ulcer.   The sore is thoroughly cauterized with fuming nitric acid, and the same antiscrofulous treatment ordered in larger doses.

A few words in regard to the diagnosis, ætiology, and clinical history of this case will be of additional interest. First of all, these ulcers have existed thirteen months ; strictly speaking, they have been successive, and not multiple ; their course has been in the third ternary of childhood,* beginning in the ninth year of life ; they are upon the face, where Neumann finds seventy per cent. of cases of lupus ; † cicatricial atrophy has been the result of repair in each ulcer ; ‡ some of these ulcers began in conjunctiva, others in integument ; and, thus far, have been confined to the ocular region of one side—facts which coincide with the characters of conjunctival lupus.§   Hebra, in his voluminous work on skin-diseases, does not allude to primary conjunctival lupus, but very briefly notes its transmission from a facial lupus through the intervention of the ectropion of

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* Neumann, 1876, 4th ed., page 64.

† *Ibid*, page 458.

‡ *Ibid*, page 457 ; also Saemisch in Graefe-S., vol. iv, page 161.

§ Saemisch, *Ibid.*

the lid, due to the cicatricial contraction of the original sore ; * and Michel reaffirms the same anatomical sequence with reference to lupous neoplasms of the conjunctiva and lid.†

In the spring of 1877, the author had the opportunity of seeing a case of primary conjunctival lupus in Neumann's practice in Vienna, which, after a lapse of two years, had attacked the nasal wing and epiglottis of the same side. Fresh microscopic preparations gave the elements of lupus. This case attracted considerable attention in local dermatological circles, and was published in a separate *brochure*.

Under the chapter of eliminative diagnosis, it is to be said, that, whereas chancroids may be multiple, their multiplicity is contemporaneous ; while these ulcers followed a law of isolated succession. The locality of the ulcers, and age of the patient forbade the idea of chancroids. Incidentally it may be stated, that the father acknowledged to have had three contemporaneous chancroids, with gonorrhœa, twelve years before the birth of the daughter. As to syphilis, secondary ulcers select the mucous membrane of the nose and mouth, uvula and tonsils, also the turbinated bones, rather than the conjunctiva ; they have a more rapid course than lupous ulcers; they destroy by phagædenic ulceration, and their base is covered by lardaceous tissue-degeneration ; while the floor of a lupous erosion is a granulating neoplasm. Between eczema and lupus are marked differences; the former has a much more rapid course ; its infiltration is more superficial than that of lupus ; while eczema never repairs with a true cicatrix.

Between herpes tonsurans, or psoriasis, and lupus are differences sufficiently characteristic. The location is as peculiar for the one as for either of the others. Herpes is annular, not ovoid, and its border has punctiform vesicles

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* Hebra-Kaposi, 1876, 2d ed., vol. ii, page 341.

† Michel, in Graefe-Saemisch, vol. iv, page 415.

without infiltration; whereas some forms of lupus have a thickly infiltrated border; psoriasis extends over larger surfaces than lupus. Epithelial cancer presents a more uneven, tubercular ulcer-surface, takes a deeper and wider range of skin than lupus, while its periphery is hard like cartilage.

The ætiology in this case points to scrofula, and not to acquired syphilis; there are no concomitant symptoms of specific repletion; nor even a dyscrasia, due to scrofula; the patient is thoroughly well, and so seem both parents.

While emphasis has been laid upon the fact of the isolation of each successive ulcer, it is conformable to the theory of lupus to regard the group as different stadia of one continuous ulcerative process; so that the attack may be said to have lasted thirteen months. The length of this attack may be prolonged in this way indefinitely. Bulkley's opinion was, that under two years lupoid ulcerations do not heal; while Neumann states, that between two stadia from ten to twenty years often elapse. In one case of macular lupus, beginning at the fifth year of life, the latter observer states that the ulcer enlarged no more than three to four lines in a lapse of seventeen years. These observations were not made with reference to lupus of conjunctiva.

The following summary will explain the exceeding rarity of lupus of the lid and conjunctiva:

The total number of eye-cases treated at the New York Eye and Ear Infirmary for seventeen years (1860 to 1879, the years 1862 and 1865 not counted) is 114,147, of which there are cases of Lupus of lid, 7; other ulcers of lid (non-specific), 27; ulcers of conjunctiva, 3.

The total number of eye-cases treated at the New York Ophthalmic and Aural Institute, from April, 1869, to January, 1880, is 34,591, of which there are cases of Lupus of lid, 5; other ulcers of lid (non-specific), 9.

The total number of eye-cases treated at the Manhattan Eye and Ear Hospital from its foundation, October 15, 1869, to Oct-

ober 15, 1879, is 18,580, of which there are cases of Lupus of lid, 5 ; other ulcers of lid (non-specific), 9.

In other words, out of 167,318 eye-diseases, there are seventeen cases of diagnosed lupus of the lid ; forty-five unclassified, non-specific ulcers of the lid, and three conjunctival ulcers.

NOTE ON AN ABNORMAL DISTRIBUTION, HITHER-
TO UNOBSERVED, OF THE SUPRA-ORBITAL AND
INFRA-ORBITAL NERVES, EXPLANATORY OF
THE RECURRENCE OF CERTAIN
NEURALGIAS.

By A. H. P. LEUF, Student of Medicine.

One evening last winter, while at work in the dissecting rooms of the Long Island College Hospital, I noticed an abnormal arrangement of certain nerves and of the foramina through which they passed. The nerves in this case were the two frontal nerves and the right superior maxillary. Each one of these divided into two branches, the inner one passing out upon the face through its proper foramen, the outer passing out upon the face through another foramen.

Having no recollection that this had been mentioned in Gray's anatomy, I sought for it there in vain, nor could I find it in Henle (Anatomie des Menschen). This latter author, speaking of the supra-orbital canal, says:
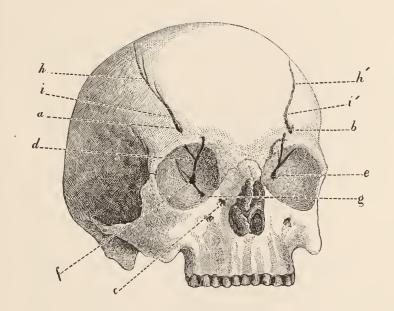
" * * * * The canal is often divided into two, which lie next to or cover each other, by a narrow or broad bridge from the beginning or at the exit. * * * Occasionally there exists without the canal of the supra-orbital notch and to the side of the same, another canal of the length and diameter of the supra-orbital, but the openings of which, as well on the forehead as in the roof of the orbit, lie further from the margin of the bone.

On 409 skulls examined by W. Krause (Zeitsch. für rat. Med., 3te R. II, 81) there were found a supra-orbital foramen and a frontal notch 114 times on both sides and 101 times on one side.

These canals were not identical with the canals of which I am writing, though similar to them. By "frontal notch" is meant the shallow groove through which passes the supra-trochlear nerve.

In other works on anatomy which were consulted these foramina were not spoken of.

Although Henle mentions the occurrence of the accessory supra-orbital, he says nothing of any accessory infra-

a—right accessory supra-orbital foramen.
b—left   "   "   "
c—right   "   infra-orbital   "
d—division of right frontal nerve.
e—   "   " left   "   "
f—   "   "   right superior maxillary nerve.
g—right accessory infra-orbital nerve.
h, h'—right and left frontal grooves.
i, i'—right and left accessory supra-orbital nerves.

orbital, nor does he speak of the frequency of the supra-orbital.

These accessory foramina or notches are not always at the same distance from the normal notch, or foramen (see plate). The accessory and constant foramina may be no more than three millimeters or less apart, or they may be as much as two centimeters apart. The first case in which this variation was noticed was so near the general average, and corresponded so closely with another seen at the same time, that it is detailed here. Both these heads were being dissected at the same time at the Long Island College Hospital.

There were found a right and left accessory supra-orbital, and right infra-orbital foramen. The following careful measurements were made in regard to the situation of these various apertures :

The right accessory supra-orbital (a) was 9 millimeters above the supraorbital margin, and 13 millimeters to the inner side of the temporal ridge.

The left accessory supra-orbital (b) was the same as on the right.

The right accessory infra-orbital (c) was 2 millimeters below the infra-orbital margin, and 13 millimeters to the inner side of the upper end of the malo-maxillary suture.

In each case the main trunk of the nerve divided (d, e, f) into two unequal branches, the abnormal branch being one-half the size of the normal one.

The right frontal nerve divided at (d) a distance of 30 millimeters from the supra-orbital margin, the distance from the supra-orbital margin to the foramen lacerum anterius being 47 millimeters.

The left frontal nerve divided at (e), a distance of 28 millimeters from the supra-orbital margin, the distance from the supra-orbital margin to the foramen lacerum anterius being 50 millimeters.

The right superior maxillary divided at (f), the beginning of the infra-orbital canal. The passage of the outer and larger branch to the face was normal. The inner branch (g) passed along the floor of the orbit over the periosteum, and pierced the latter 6 millimeters behind the infra-orbital margin, to enter the short canal terminating in the accessory foramen (c). The length of this inner branch from the point of division to its exit from the accessory foramen was 34 millimeters.

The frequent occurrence of these accessory foramina may explain recurrence of neuralgia after neurotomy, for the whole nerve would not be divided in such a case.

From each accessory supra-orbital foramen, a groove (h, h′) passed upward and a little outward, being 13 millimeters to the inner side of the temporal ridge, following it for a little more than 4 centimeters and then turning toward the middle of the sagittal suture. This groove lodged the accessory or external supra-orbital nerve (i, i′), and was also found quite often upon the skulls when the accessory foramen was wanting.

The arteries did not divide, but passed on as usual.

In some of the skulls examined, the inner division of the superior maxillary nerve passed through an accessory infra-orbital canal. In these instances the accessory canal met the other or normal canal where the nerve divided, or a little anterior to the division.

In the examination of skulls in which two notches were found, it has not been lost sight of that the supra-trochlear nerve sometimes also runs through a shallow notch. Nor has it been forgotten that the frontal nerve divides midway between the apex and base of the orbit into supra-orbital and supra-trochlear. Many other points, too, which may mislead one in such examinations, were constantly kept in mind. A double mental foramen has not been found, although looked for.

The total number of skulls examined,$=300$.

The total number of skulls showing variations,$=90$, or 30 per centum.

The number of variations in these 90 skulls,$=121$.

Of the different kinds of variations observed in these 90 skulls, there were the *single* 59, *double* 28, and *triple* 3.

Among these 90 skulls, there were the 98 *accessory foramina*, 22 *accessory notches*, and 1 *accessory groove*.

The following figures show the relative frequency of this variation in the different parts of the bony face.

Supra-orbital.		Infra-orbital.	
Right,	30	Right,	4
Left,	19	Left,	6
Right and left,	20	Right and left,	4
Total,	69	Total,	14

In the other 7 skulls the variations differed from each other to such an extent that they could not be grouped together. Not one of these 300 skulls showed 4 accessory foramina.

I am indebted to Dr. Landon Carter Gray for the suggestions which caused me to investigate this subject.

It gives me pleasure to thank Drs. Jas. R. Wood, Frederic S. Dennis, Thos. E. Satterthwaite and R. Abbe, for their kindness in obtaining for me access to requisite material in the museums of the Bellevue Hospital Medical College and the College of Physicians and Surgeons of the City of New York.

The skulls belonging to the Long Island College Hospital contributed largely to the material on which this paper is based.

EDITORIAL DEPARTMENT.

OBSERVATIONS ON THE INSANE ASYLUMS OF CALIFORNIA AND NEVADA.

By W. R. BIRDSALL, M.D.*

ASSISTANT PHYSICIAN TO THE MANHATTAN HOSPITAL.

Recognizing that the movement inaugurated by this Society, in the direction of " lunacy reform," is one of national importance, and is not limited to the State in which the Society's work has, from necessity, been restricted, I believed that it' would be of interest to present some facts in regard to the condition and management of certain institutions for the insane in other States, which I have recently had an opportunity of visiting.

If the statements which I shall make serve ever so little to strengthen the argument, that great and sweeping reforms are necessary in the management of the insane in this country, both in principle and in practice, and that this society has simply taken a step forward to hasten the evolution of this matter, which must of necessity result ; and that it would be derelict in its duty to science and humanity if it retired from the position it has taken, then they will have served a useful purpose.

During the past winter I visited the two California asylums for the insane, at Napa and Stockton, also the Nevada asylum at the latter place, and through the courtesy of the superintendents and their associates was enabled, I think, to obtain as thorough a view of the institutions as a single visit would permit.

In the Napa Valley, a short distance from Napa City, on a tract of land embracing about two hundred acres, is situated the imposing edifice known as the Napa State Asylum for the Insane ; the whole completed by the State of California, at a cost of about a million and a quarter dollars. From an artistic point of view its architectural beauty is very fine, yet, as the trustees remark in their report for 1879, " While the asylum building is a magnificent structure, the beauty of which may well be admired, it is nevertheless true that it cost a great deal of money—so much that there has been considerable dissatisfaction at it on the part of tax-payers. The centre portion of this building was designed for, and is devoted to the residences of the families of the physicians, and is by far the most costly part."

As an example, I would state that the interior halls of this portion are elegantly decorated in gothic style, and profusely ornamented with Latin inscriptions, which are not only valuable on account of the wisdom they contain, but are costly, as they are beautifully cut in stone. The portico on the second floor above the main entrance evinces the philosophic tendencies of the designer, who has attempted an hieroglyphical exposition of the evolution doctrine. Here we find representations of various forms of life, " from Monad to Man," also cut in the carved stone columns and tablets of this structure. Nor are the State and national emblems wanting, for the California bear and the American eagle are also fossilized in large size, as figure-heads of the institution. We would not discourage art in this new country, where so little is to be found, but we would demand that utility, safety, and comfort be satisfied, before ornamentation has exhausted the treasury.

Whatever the architect knew about sculpture, the ancient classics, and modern theories of development, apparently he knew or cared less about sanitary measures relating to insane asylums. After erecting a building with four stories, basement, and attic—a radically defective plan to begin with—it was not until after the building was occupied, and a patient had jumped from an upper story window, that window guards of any description were sup-

plied. The Resident Physician, as the superintendent is called, has been obliged to knock off the fancy knobs of the doorhinges, which served no purpose except of ornament and as implements wherewith to hang oneself. The plumbing is somewhat de- fective. The wards were clean and orderly, also the patients' rooms, with two exceptions, where we found the patients locked in their rooms, and their excreta giving rise to a decided stench —one result of the system of locking patients in separate rooms with closed doors, and allowing the attendants to prom- enade the wards or to sit leisurely at their work. There are too many of these rooms in this asylum, a fact admitted by the Resident Physician. There is not one padded apartment for violent patients, and no rooms where suicidal patients could not find means of carrying out their intentions. All the rooms are well lighted. I was informed that many of these defects would probably have been avoided if medical men had had something more to say about its construction than they in reality were allow- ed. Is it not remarkable that a State which cannot afford to sup- ply a sufficient number of physicians and attendants to care for its insane patients, can afford to place those they have in marble halls? Is it not strange that, after sending a commissioner to Europe to investigate asylums, his reports respecting the wants and faults of such buildings should have been disregarded in many of the most important particulars?

The intended capacity of the institution is 544 inmates ; its full proper capacity is estimated by the Resident Physician at 628, and the actual number of patients at the time of my visit was 803. Even at the time of the last report, when but 714 patients were present, the condition is represented as " overcrowded," and it is stated that " of one hundred and sixty-five single rooms in the male wards, one hundred contain two patients each. In one instance already a patient has taken the life of his room-mate, and no man is wise enough to know when other calamities of a similar character may take place. There is a constant dread upon the minds of those who are held responsible for their proper care and comfort."

In the case referred to, the homicide, who was classed among
the chronic insane, was confined with a patient whose prognosis
was favorable. In the night he commenced an onslaught upon
his companion, under the impression that he was killing bears.
The door was locked, the attendants were sleeping peacefully in
their beds, and the asylum left under the guardianship of two
watchmen, who required from one-half to three-quarters of an
hour to make their rounds. The interval was too long in this
case to save the life of this man. This case illustrates three
faults in this institution—overcrowding, improper classification,
insufficient attendance.

Confining a patient who has some chance of recovery with an
unfortunate wreck whose intellectual sun has set forever, is
fraught with too many dangerous consequences to be permitted,
particularly when eight hundred patients are left, virtually, with-
out attendance during the night hours. In this institution idiots,
epileptics, chronic and acute cases of insanity are mixed together,
the only classification being made according to the degree of vio-
lence or untidiness. As no other place has been provided by the
State for them, idiots are received, on protest, however, by the
Resident Physician.

There are twenty-six wards in the institution, and fifty-two at-
tendants ; or two to each ward. They are presided over by a
male, and a female supervisor, for the male and the female de-
partments respectively. This gives an average of over seventeen
patients to each attendant. Even in the "untidy wards" the
average is about the same. Such an insufficient number thwarts
at once any attempt to carry out a non-restraint treatment, and,
as might be expected, restraint is used ; though Dr. Wilkins, the
Resident Physician, informed me that while he wished to do
away with it, he was unable to do so entirely, on account of the
insufficient number of attendants at his command. He called at-
tention to this insufficiency in his last report. The implements
for restraint, which I saw, consisted of straps, wristlets, the closed
sleeves, and a straight backed large wooden chair, made fast to
the floor, and having a wooden bar from one arm to the other

which locks the patient in. I saw but two or three of these. The implements I understand are used by the attendants when the physicians are not present, and no restraint record is kept. In one of the untidy wards my attention was called by Dr. Wilkins to a little idiot boy, who was walking rapidly up and down the ward with a strong man on each arm. One of these men, the Doctor informed me, was one of the most unmanageable patients in the ward, and was kept in restraint. This boy acquired the habit of rushing up to him whenever he became violent, taking him by the arm, and walking with him up and down the ward. He soon had him under perfect control, and now no restraint is needed. Recently he had taken a second violent case under his charge, with an equally successful result ; and sometimes, as on this occasion, he could be seen with both of them under his guardianship.

When an idiot boy can do so much by perseverance, patience, and kindness, what ought we to expect from intelligent and humane attendants ?

In speaking of attendants, the medical officer in his last report, states that he has been obliged to discharge some attendants on account of unkindness to patients, etc. And at the same time he refers to the responsibility and danger of the position, and to the scars his attendants have received from patients. Admitting the truth of his remarks, they should not furnish an excuse for lax discipline. On the contrary, they create the demand for constant watchfulness on the part of physicians and supervisors. As to the presence of scars, while they may not disappear under a non-restraint system, they are what we might expect when force is used to control patients.

The proportion of patients who are employed is quite small, on the admissions of the Resident Physician, who said that even in his efforts to employ the patients in improving the grounds, he had met with strong opposition from the workingmen's party, on the theory that the working classes should not be deprived of labor when there was work to be done on state institutions. Truly, the idea that employment is necessary to maintain, or to

recover health, has not yet taken very deep root among the masses !

In this large institution with over eight hundred patients, there are but three physicians, including the resident physician, who has, besides his medical duties, the management of a farm of about two hundred acres, the supervision of the building and the correction of its defects, the furnishing of supplies and many other perplexing duties. Think of a superintendent who must divide his mental labor between eight hundred patients, and the economical management of an institution to enable him to main-tain the daily *per capita* expense at $44\frac{7}{12}$ cts. Think of each physician having two hundred and seventy patients to look after, with an average daily reception of one or two new patients (615 in 1879). You will all anticipate the reply to my question, " Do you accomplish any pathological work in the institution ?" The answer was : " We have not sufficient time." And yet there were one hundred and four deaths during the last year. I do not mean to infer that no autopsies are made (on the contrary I was present at one at the time of my visit), but that no systematic examinations are made of the nerve centres. I received the same reply from one of the assistant physicians that there was no time for such work, nor even for proper study while so many patients were to be cared for. He was willing and anxious to pursue such studies, but neither the implements nor the time were at his disposal. Now is the time for this class of men to demand better opportunities for doing such work while the subject is undergoing agitation.

The resident physician receives three thousand dollars annu-ally, and the two assistant physicians two thousand dollars each.

The asylum at Napa was built to relieve the overcrowding of the Stockton Asylum, which had been in operation for about twenty-eight years, and has had over one thousand patients at the end of each year for the past ten years. It still has about one thousand inmates. To quote from Superintendent Shurtleff's last annual report : " It is, though still crowded, filled principally with the class of patients called 'chronic or incurable.' " Again

he says, " to allow any considerable increase of the existing num-
ber in the present buildings would be a manifest wrong, and
scarcely less than a culpable cruelty on the part of anybody who
possesses the authority to prevent it."

The plan advised by both Dr. Shurtleff and Dr. Wilkins is the
erection of plain, substantial buildings of a cheap character. The
condition of certain buildings are referred to by the superintend-
ent in the following language : " The one-story brick buildings,
formerly called ' mad houses,' should be enlarged and improved
so as to entirely change their character, or they should be taken
down and abolished. They are disgracefully below any modern
standard of accommodations even for the class of patients for
whom they are designed." It did not require an extended ob-
servation to confirm the statement concerning overcrowding, and
to add that there is a corresponding deficiency in the number of
attendants—at least if a non-restraint system is to be carried into
practice.

I found but few patients under restraint in the quiet wards, but
in the untidy wards the proportion was quite large. As to the
methods of restraint, I saw the leather wristlets, the waist-strap
and loose strapping in bed. Judging from the number of these
implements in actual use and the number in the store-room
where men were at work repairing them, one would conclude
that they constitute at present, or have constituted in the past,
no insignificant place in the treatment of the insane in this insti-
tution. The Superintendent is opposed to the use of the crib.
On asking him what he thought of the chair which I saw at
the Napa Asylum, he replied that he found one when he came to
the asylum, but ordered that it be split up for kindling wood.
It is unfortunate that this good beginning could not have been
continued, and that the other implements for this purpose were
not added to the flames thus kindled, and their place supplied
by kind and well-trained attendants.

The same dearth of pathological work, the same deficiency in
medical officers—there being only two physicians besides the
Superintendent—may be observed here that was seen at the Napa

Asylum ; although there are one hundred deaths a year, and over one thousand patients. Dr. Shurtleff informed me that he could employ a large number of patients if he had a sufficient number of attendants to look after them ; as it is, but little work of a systematic nature is accomplished.

The so-called Nevada Asylum is located at Stockton. It is an institution conducted by two physicians, who have a contract with the State of Nevada to take care of its insane patients. They also receive patients from certain territories where no asylums exist. The number confined here is usually about two hundred. The greater part of the patients belong to the chronic class. They represent to a large extent, a rough class of men ; the criminal class being also represented. It is fortunate that this is the case, for a more barren place than the large pen—the only airing court they possess—would be difficult to find in the great desert of their own state. Even the sage brush is absent. With the monotonous blue sky above, the high board wall and buildings about them in absolute idleness, could we have a more perfect extinguisher of the spark of cerebral activity that is left. While they are probably well fed, and are supplied with comfortable beds, mostly in large dormitories, the condition of those in the untidy wards was deplorable. The majority were under restraint by means of the waist strap, handcuffs, and large leather muff ; and those who were in solitary confinement were in poorly lighted pens, rough strong structures with heavy doors, locked with heavy padlock and chain. They were well supplied with air however. In one of these cells we found a poor wretch half clothed, his hands fast in a large muff, and a disgusting odor of human fæces pervading the apartment.

What a picture for American civilization at the close of the nineteenth century !

Evidently this institution is intended simply to keep these unfortunates from running at large, and probably æsthetic tendencies would produce but little effect upon the majority, but we cannot conceive of surroundings better calculated to annihilate the chances of recovery that some of the inmates possess, than are to

be found here. There is no classification except the separation of the male from the female patients, and the separation of the untidy and dangerous inmates from the others. In the female department, a few of the patients had some needlework, but the majority were in idleness. A few of the male patients assist in the necessary work within the building, otherwise no work is done by them I was informed. The physicians do not live at the instition, but according to the statement of the Supervisor, they visit the patients every day, and prescribe for them when it is necessary.

It will be seen from a review of my statements that these institutions are not lacking in many of the defects which have been pointed out in the asylums of our own State. These defects are in the main as follows :

(1.) There is overcrowding, which not only affects the health of the inmates directly, but prevents proper treatment and a proper classification.

(2.) We find an insufficient number of attendants for the safety of the patients, resulting in the consequent use of restraint not in harmony with a rational and humane mode of treatment ; also preventing the employment of patients as a therapeutical measure.

(3.) There is a qualitative deficiency in the attendants, from the fact that having been accustomed to methods of restraint, and to inefficient discipline, only a portion of them could be sufficiently reformed to carry out the less convenient, more difficult, free treatment.

(4.) The number of medical officers is so small as to prevent a proper examination and observation of the cases, and a proper supervision of the attendants by the physician—a very important point ; also rendering it impossible to prosecute studies in connection with their specialty, or to utilize the pathological material of the asylum for scientific purposes.

(5.) There is too much work for the superintendent outside of the duties directly connected with his profession, which leave him an insufficient amount of time in which to study his patients, in

which to perform, direct and review clinical and pathological
work in the institution, and prevent his becoming a teacher to
those who are associated with him.

(6.) There is an imperfect system of classification, in that the
acute and chronic insane are not separated, and that there is no
provision for idiots, epileptics or inebriates.

(7.) There is not sufficient employment for the patients as a
remedial measure.

(8.) There are some defects and deficiencies in the buildings
and grounds, affecting the health and safety of the inmates, one
in particular being the absence of advantages for the employment
of the patients.

These are some of the important imperfections, though not all.
They have been presented to you so often, as applying to other
institutions, that it seems almost needless to repeat them here.
They are given, however, to show their application to the asylums
of which we have spoken. Not only are these faults recognized
by the advocates of lunacy reform in this body, but I have reason
to believe from my conversations with the superintendents of the
California asylums, and from their published statements, that they
would also acknowledge, in the main, the truth of my assertions.
The exact qualifications in this respect would require more time
than is available on the occasion. I may say, however, that one
superintendent informed me that, while he thought that non-re-
straint was correct in theory, it could not be carried out in prac-
tice in this country, on account of the expense. He did not want
to fill his already crowded asylum with attendants ; otherwise he
was in favor of non-restraint. Dr. Wilkins, of the Napa asylum,
pointed out to me at once many of the imperfections in this in
stitution.

The Superintendents of both of the California asylums ex-
pressed themselves as hoping that some good would come from
the agitation revived by this society. Dr. Wilkins was sent in
1870, by the State of California, as a commissioner, to visit the
principal insane asylums of the United States and Europe. He
visited forty-five in this country, and one hundred and four in

Europe. In his report much valuable statistical material is collected. One is surprised, however, to find in the Napa asylum so much that is in opposition to the views to which he gives his support in this work.

With due respect to these men, notwithstanding their acknowledgements, and at the same time without impugning their motives, while we recognize the difficulties under which they labor, we must confess that their efforts in the way of reform, concerning the majority of the points mentioned, appear rather lukewarm, if we may judge from the demands made upon the trustees in their published reports. If as much stress had been placed upon the necessity for more attendants, for more physicians, for instruments and books for the purposes of study, I am convinced that some of these defects would have stood forth less glaringly. There is a power behind the throne of an asylum superintendent in this case, as in many others, upon which the blame is cast, and this is a point which must not be overlooked.

As an example, and to make an exception to the above statement, we might mention that, notwithstanding the efforts on the part of Superintendent Shurtleff to induce the authorities to ameliorate the condition of overcrowding, and to correct the defective character of the buildings, the desired results have been dilatory in coming, and are still far from being realized. In some cases these defects are due to the niggardly action of the authorities, or their false economy ; in others, to such unwise expenditures as the erection of a palace, in which the inmates are left unattended to slaughter themselves. Then again, the political machine so entirely controls many of our charitable institutions, that a superintendent who is not controlled by it, or is not one of its operators, must indeed be possessed of courage, vigilance and principle, to carry out the reforms demanded to-day by medical and social science, in which case he stands some chance of being decapitated.

It is to be hoped that there are other superintendents who will not only advocate reform, but will also show us that they can execute it. It remains to be seen who among their number will

be the fortunate pioneers in hastening this reform. He who is wise enough to see the drift of the current, and to trust himself to its force, will, I believe, be one of the first to demand the means to enable him to destroy many of the objections which have been mentioned. Continual effort in this direction will change public and professional opinion, and thereby develop a force that neither asylum superintendents, nor political rulers who control the disbursement of public moneys, will consider it advisable to oppose. Then, with an increase in the number of medical officers, if fair competition be allowed, there will be some chance for our hospitals for the acute insane becoming schools of psychiatry of a thorough character, to which now no claim is made, but which is as necessary as hospital training in other departments of medicine.

I believe that coöperation in favor of this movement is to be expected, from at least a portion of the medical officers of asylums in this country, when the severe terms, which from the nature of the subject were necessary, shall cease to carry the erroneous impression that personal motives are the only basis on which these efforts at reform rest.

Certainly those whose names and opinions I have used in this paper will not, I trust, consider my criticism as prompted from any other motives than the desire which I believe we hold in common, the advancement of our profession, and through it the amelioration of the misfortunes of that unfortunate class of our fellow beings, the insane.

I cannot refrain from closing this paper with a few paragraphs on the non-restraint treatment by my esteemed friend and former teacher, Doctor Theodore Meynert, who was the first in Vienna to carry out the free treatment of the insane. I have translated them from his official report for 1876.

"That part of the so-called psychical treatment, that is the non-restraint treatment which is considered the most important, avoids the irritation of the patients through ill-humor or otherwise. In consequence of which the antiquated method of overawing by the physician must here pass entirely out of use. In

place of this convenient method appears a little more reflection concerning the individual patient before one. The casuistic enumeration of all the passable suspicious actions of the insane will be thus rendered unnecessary.

Who believes himself able to overawe men that fail to discriminate between each other ; who believes that convictions and impulses, developed in a morbid interior, can be changed and given up through force ; he is to-day, from a therapeutical standpoint, ignorant of his profession.

Who so deports himself as if he were the controller *over* the patient, never wins the influence over him that he does who proves every moment that he is there *for* the patient.

Who credits the patient with the mental activity to see in his controller his benefactor, he holds the lunatic for a sensible person, and deports himself, in consequence, undoubtedly otherwise than he expects from the patient.

The attendant's fist will certainly not come into use more frequently than through the patient's forced toilette.

To be, not unfrequently, an anvil for the patient but a hammer toward the attendant, is a double principle of the physician who desires to treat the insane without restraint.

To be in favor of the free treatment requires a special mode of thought, which stands in opposition to the old methods of psychiatry. This was experienced with difficulty by those physicians who had grown old in the latter methods, most of whom had already endorsed restraint in books or other writings, because a reform of their entire personality as physicians must follow.

In consequence of this prejudice against the non-restraint system, resulted the attempt to allow restraint to be insinuated under all sorts of masks with the avoidance of the jacket.

Herein wit may be developed, which alas, does not tend to enliven the patient.

In our clinic at the General Hospital the non-restraint system prevails, with the exception of the rare variation which surgical treatment requires."

Note.—Certain portions relating principally to statistics, have been omitted.

NEW BOOKS AND INSTRUMENTS.

The Student's Guide to Diseases of the Eye. By
EDWARD NETTLESHIP, F.R.C.S. With eighty-nine illustrations.
Philadelphia, Henry C. Lea, pp. 369.

A guide to the diseases of the eye may be defined as a book
which presents all the important practical and scientific facts of
the ophthalmology of the day, in a language that is precise, simple
and clear, and in an arrangement that is logical and systematic.
If such be the desiderata of a true guide, Mr. Nettleship's book
very nearly attains the ideal standard. It is impossible to dwell
in detail on the excellent points, in which this treatise abounds.
Suffice it to say that every page bears witness of untiring and con-
scientious industry in the collection of facts, of discretion and ex-
perience in their condensation, of rare ability in the delineation
of the symptomatic characteristics and the pathologico-anatomical
basis of disease.

In the preface of the fourth edition of his manual of ophthal-
mology, Schweigger says that the value of a treatise depends as
much upon the matter eliminated as upon the matter presented.
In manifest concurrence with the opinion of this author, Mr.
Nettleship employs the weeding process very extensively, so much
so that in a few instances he is open to criticism for having omit-
ted some relevant points.

In speaking of the irritation and inflammation of the conjunc-
tiva and skin of the lids due to prolonged use of atropine, he
recommends that daturine be used instead of atropine. In our
experience daturine is a very unreliable mydriatic, while dubois-
ine, which is not mentioned, dilates the pupil even more power-
fully than atropine, without producing any local trouble.

The chapter on sympathetic ophthalmia or " ophthalmitis " as
the author styles it, contains no allusion to optico-ciliary neuro-

tomy or neurectomy. It is true that these operations are still *sub judice*, but as they have been very extensively practised during the past three years in France, Germany and the United States, a reference to these promising innovations would have been appropiate.

On page 53 we read that the term " *Ophthalmia Tarsi* " includes all cases, in which the border of the eyelid is the seat of subacute or chronic inflammation, and on page 66 we find the statement, that the word " Ophthalmia" includes all inflammations of the conjunctiva and should not be applied to any other disease.

The author dwells on the inconvenience of the old system of numeration of spectacle glasses, and in comparing the inch with the metre scale gives a decided preference to the latter. His comparison is markedly disparaging to the old inch system, and we are greatly surprised to find that in the chapter on the anomalies of refraction and accommodation he neglects entirely the vaunted metre and employs exclusively the much abused inch.

The term " une dioptrie " introduced by Monoyer to express the dioptric power of a lens of one metre focal distance is rendered by " a dioptrie." Dr. Swan M. Burnett in his translation of Landolt's Manual of Examination of the Eyes, calls it " a dioptry." This word is etymologically more correct and less likely to cause confusion, than the " dioptric," plural " dioptrics " of English authors, and should therefore be universally adopted.

[E. G.]

Fourth Annual Report of the Managers and Officers of the State Asylum for the Insane at Morristown, N. J. October 31, 1879.

The New Jersey State Asylum at Morristown is one of the largest and most expensively built of the institutions for the insane in this country. It has accommodations for eight hundred patients, and two million four hundred and fifty thousand dollars have been expended in the purchase of the site and the construction of the buildings. It is four, and in some parts more than four, stories in height, and it is practically fire-proof, all the interior walls being of brick and the floors laid upon girders of iron, connected throughout by arches of brick and cement. The woodwork has been reduced to a minimum in the construction of the building, and a fire in one room could hardly communicate to another. The building is heated with steam by indirect radiation, and the gas jets are or could be placed out of reach of inter-

ference by the patients, so that the risks of fire are not great. The necessity for the greatly increased expense of absolutely fire-proof construction of the building is not apparent. If the portions of the building between the separate halls or wings had been made fire-proof, and to contain the stairways from the basement to the mansard roof story, a fire could at most destroy only one wing or section of the building. Why, located as it is upon a farm of more than three hundred acres, the institution should have been so piled up toward the sky, is only explicable by the knowledge that the Association of Superintendents of American Institutions for the Insane approves of this plan of building. and that the Commissioners for the construction of the asylum, in the beginning of their work, secured the advice and approval of the leading members of the Association of Superintendents.

The report of the Superintendent of the Morristown Asylum for the year 1879 is, in many ways, a curious document. The statistics are meagre, but from them it appears that during the year more patients have been discharged by death than by cure, and the same thing is true of the whole period since the opening of the asylum. The report does not indicate how large a proportion of the patients are considered curable, but the percentage of recoveries upon those admitted during the year, and those under treatment during the same period, indicates that not more than ten per cent. of the patients in the asylum can be fairly considered as curable, so that the institution must be regarded as merely a home for ninety per cent. of its inmates. It appears that seventy-four of the whole number of private patients, who have been in the asylum since its opening, have been sent from New York, but that the physicians of this State, who have committed their patients to the care of the Superintendent of the asylum at Morristown, have known very little about his professional acquirements will, we think, appear from further consideration of the report. It may, however, be that the medical chief of the Morristown Asylum represents the best type of what, we fear, is a retrogressive and lifeless specialty, and that other asylums are either no better or much worse in their care and treatment of cases of insanity.

Upon the question of employment for the insane the report, while admitting its curative value in many cases, says it is by no means profitable, because of the short time made and the necessity of having overseers to supervise the work. The report claims that female are more industrious than male patients, and

that the inmates of American asylums, unlike those in foreign institutions, will not work unless payment of wages is made or promised. The whole spirit of the paragraph indicates that the superintendent does not believe in the practicability of systematic employment of the insane as a means of diminishing excitement and lessening the demand for mechanical and medicinal restraints. The assumption that the patients in American asylums cannot be employed and are less obedient to reason and moral influences than those in asylums abroad, is advanced as well in discussions in this country of the non-restraint system of management of the insane, and in this connection the testimony of Dr. Bucknill in his " Notes on Asylums for the Insane in America," may be given. " The essence of the non-restraint system is to lead the lunatic by such remains of mental power and coherence as the physician can lay hold upon, and where there has been least mind there will be the slightest means of moral guidance, but to make the men of the United States an exception because they, more than others, have learned how to rule themselves, is a blundering censure upon their culture and their virtues. The fact is that the hopeless, cheerless and unemployed life in the halls of our asylums results from a conviction that it is the safest and least troublesome mode of dealing with the insane and because of the tendency of institution life to degenerate into routine, and to use the expression of Pinel, " unfortunate is the fate of those maniacs who are placed in hospitals for the insane, where the basis of practice is routine, and where, perhaps, the patients are abandoned to the savage cruelty of underlings." Individualized treatment of patients or efficient supervision of attendants becomes impossible in an asylum which is intended for eight hundred patients, and which is officered by not more than three physicians.

We cannot refrain from giving a quotation from the report on the subject of amusements as an illustration of the owl-like gravity with which the venerable superintendent utters the merest platitudes and the very pellucid style of English composition which characterizes his report.

" Among the selections for the stage exercise, in the amusement room, no performance gives greater or even so much pleasure to a large majority of the audiences, as plays and music by negro minstrels. This kind of performance is an appeal to the sense of the mirthful or ludicrous, a primitive tendency, or more properly a faculty of the human mind, the activity of which does as much

to secure the natural resiliency or elasticity of the feelings, and thus protect them against dullness and decline, as any other feeling or sentiment of the mental group. I regard the statement of this fact, so constantly verified by observation and even by personal experience, as one of great practical value to all who desire to become permanently connected with the care of disordered minds. By this I do not, of course, mean that persons thus engaged may, in any circumstances, wantonly amuse themselves by the eccentricities of the people under their charge, but that a more elastic and tranquil state of feeling, on their part, as well as better health, will be maintained by them, if they are so mentally constituted as to be able to see and appreciate the humorous side of the little as well as the large occurrences observed in their daily and hourly duties. I may add, further, that persons of this mental balance or tendency are, even in life inside of asylum walls, more hopeful, cheerful and successful than those of an opposite character."

But the most noteworthy chapter of the report contains the views of the Superintendent on the physiology of the brain. He says : " Strange as it may seem, yet it is no more strange than true, that correct knowledge of the physiology of the brain or knowledge derived from systematic observation of its healthy functional action is, at best, and in the minds of a few persons only, in its infancy." We have been puzzled to find out what is intended by the modifying sentence, " in the minds of a few persons only." Does it mean that correct knowledge is in its infancy in the minds of a few persons only or that only a few persons share the infantile knowledge of the Superintendent ? We understood the latter to be the true solution of the problem and we then learn that this defect in knowledge is caused by the worthlessness of the results of scientific study of the anatomy, physiology and pathology of the brain and because the physiologists and psychologists, " who have influenced the belief and modes of thinking of the past and present generations, have through the influence of prejudice against the only correct method of obtaining information of its functions during life, denied or ignored the results, which comparatively few others, but equally eminent observers have reached." The style of composition of the report is in parts so incoherent as to be almost unintelligible, but the Superintendent at any rate makes it clear that he accepts the dogmas of phrenology, as "a rational and practical basis for the medical, mental and moral treatment of each and every case of insanity

that may occur." He goes further and after quoting an extended statement of the doctrines of phrenology, says : " The facts and influences of this system as stated, being true in regard to the physiology of the brain, the great importance of the discovery will be appreciated, as it furnishes the basis of a clear, full and intelligible system of mental science or philosophy." This conclusive statement of the claims of phrenology as the basis of a system of psychology is possibly intended for the benefit of the Professor of Mental Science in the College of New Jersey, at Princeton, for we learn that the Trustees of that Institution of learning some years ago conferred upon the Superintendent, who then had charge of the asylum at Trenton, the degree of LL.D. in recognition of his eminence in the insane specialty, and gratitude for an honor, attempted to be conferred, may not be an unknown element in the mental experience of a follower of Gall.

It is curious to note that the superintendent, in his report, does not give any reason for his faith in phrenological doctrine. He merely says the views of phrenology are his views, and therefore to be received. He quotes in support of the truth of phrenology from Gall and Spurzheim, whose work belongs to the last and the early part of the present century ; from George and Andrew Combe, whose works were published nearly fifty years ago ; from Sir William Ellis, who was superintendent at Hanwell before the days of Conolly and from others, all of whom belong to past generations, and none of whom have any weight of authority among living physiologists and psychologists. While it is true that some physicians in this country who are connected with asylums for the insane accept the teachings and unproven dogmas of phrenology, we have yet to learn of their acceptance by any educated physician outside of an insane asylum, and we do not know of any college or any reputable educational institution in the United States in which the students are taught phrenological doctrine as the basis of mental and moral science, or in which the terminology of phrenology is used in the classification of the faculties of the mind. The work of Gall, Spurzheim, George and Andrew Combe, and the earlier phrenologists, may have had its value in spite of the baseless theories which they advocated, but phrenology has long passed into the catalogue of false doctrines, which have for a time influenced the thoughts of men, and it may be considered as a discarded and extinct belief.

The report throughout is a most remarkable exhibition of defective knowledge and long-continued arrest of mental develop-

ment.   The superintendent has evidently read nothing that has
been published, even in his specialty, within the last thirty years,
except, perhaps, the *Phrenological Journal*, and he is clearly ig-
norant of all modern contributions to the physiology and pathol-
ogy of the nervous system, and of modern modes of diagnosis of
nervous diseases by physical means and by the aid of instruments
of precision.   The report might have been written thirty or forty
years ago, and in fact the superintendent, when he was in charge
of the asylum at Trenton, in the year 1852, in his report for that
year, promulgated the doctrines of phrenology as the basis of
classification of mental disease, and that report for the most part
was an exposition of the teachings of phrenology in their relation
to mental disorder.

That our hopes for asylum reform are not likely to meet speedy
fulfilment is, we think, a fair inference from reading the report of
the managers of the asylum at Morristown.   The managers of the
institution are among the most prominent and influential men in
New Jersey, and yet they declare that " The remarks of the super-
intendent on the ' Physiology of the Brain,' and the practical les-
sons therefrom drawn as they are by Dr. Buttolph, who has made
the study and treatment of insanity the work of his life, deserve
the most careful consideration of all who are interested in the
care and cure of the insane."

That a State, situated as New Jersey is, with a wealthy, intelli-
gent and progressive population, should expend nearly two and a
half million of dollars in the construction of a building for its
helpless insane, and should then place in charge of it as chief ex-
ecutive officer a man who, in his training, his beliefs, and therefore
in his modes of treatment, belongs to a past age, is an unaccount-
able exhibition of unwisdom.   [J. L B.]

A Practical Handbook of Medical Chemistry, applied
to clinical research and the detection of poisons.   Partly based
on " Bowman's Medical Chemistry."   By WILLIAM H. GREENE
M.D., Demonstrator of Chemistry in the Medical Department of
the University of Pennsylvania ; Editor of Wurz's Elements of
Modern Chemistry ; Member of American Philosophical Society ;
etc., etc.   8vo, pp. 310.   Henry C. Lea's Son & Co., Phila-
delphia, 1880.

This new text-book comes to us under the guise of an old one ;
as all who are familiar with Bowman's Medical Chemistry will at
once recognize by its typographical appearance, its title-page, its

general arrangement, and also in its illustrations, although a number of new plates have been introduced. It is designed to supplant this older work by furnishing newer methods, and is modeled, as are most of the recent works of this character, on the writings of Gorup Besanez, and of Hoppe-Seyler. It has about forty pages less than Bowman's work, and to that portion which treats of the urine—and after all it is principally in urinary analysis that the latter has been of use to the medical student—only about fifty pages are devoted ; less than one-third of the space occupied by the same subject in the other work ; although the author makes up for this in part by his compact style, and by the introduction of eighty-five pages on organic proximate principles, normal and abnormal, taking part in the animal economy. There are twenty-eight pages on the blood ; and sixty pages upon other animal fluids and solids, excretions and secretions. Part Third consists of seventy-five pages devoted to the detection of poisons. This is the part based on Bowman's Chemistry. The appendix furnishes some useful notes on volumetric analysis and the preparation of standard solutions. It is gratifying to observe that the author confines himself to the metric system and to a modern nomenclature.   [w. r. b.]

A System of Medicine.—Edited by J. Russell Reynolds, M.D., F.R.S., etc. American Edition. Edited by Henry Hartshorne, A.M., M.D. In three volumes. Vol. I, pp. 1127. Vol. II, pp. 935. Philadelphia, 1879, Henry C. Lea.

Dr. Reynolds' System of Medicine has long been favorably known, but its high price prevented its dissemination among American physicians. We suppose that it is to remedy this fault that a reprint of the work in close, double-columns, with some notes of an American editor, is now offered us. This System of Medicine, like other coöperative literary productions, is open to the charge that its separate articles are of very unequal value, and also to the more serious objection that due harmony of proportion between different topics has not been maintained. Many of the articles in the book are of extreme excellence, as for example Dr. Wilson Fox's on pneumonia, that on insanity by Maudsley, those on cerebral hemorrhage and convulsions by Hughlings-Jackson, the varieties of cardiac disease treated of by Dr. Gowers, etc. On the other hand it must be said that several diseases of the spinal cord are insufficiently described, and it is in this part of the work that its antique character appears. Since 1868 (the date of

appearance of vol. II of the English edition,) very great progress has been made in spinal cord pathology, and these are but imperfectly expressed in Dr. Hartshorne's foot-notes. Without these additions a large part or the work would be nearly useless to the student of to-day. As a proof of the age of the original part of the " System " it may be stated that the elaborate article on pneumonia has no foot-note reference to anything later than 1869 —ten years ago ! The same serious criticism must be made respecting the article on diphtheria and many others.

In conclusion we would suggest that in order to have made a really useful American edition of the work, the coöperation of a large number of American physicians or specialists should have been secured, in order that reasonably full additions might have been made to bring all the articles up to date.   [E. C. S.]

ABSTRACTS AND SUMMARIES.

The Second Year of the Therapeutical Society of New York. By ANDREW H. SMITH, M.D., Secretary of the Society.

In a former communication to the ARCHIVES was sketched the history of the Society and its work during the first year of its existence. There was much in that record which gave promise of future usefulness for the Society, and showed the correctness of the plan upon which it was organized.

The second year has not been less successful than the first. The entire list of forty members has been filled, and steps have been taken to so amend the constitution at the next annual meeting as to extend the limit of membership to sixty.

In addition to this, provision has been made for the creation of corresponding members, and prominent men in Boston, Philadelphia and other cities have already signified their willingness to coöperate with the society in this way, and have been duly elected.

At a meeting of the society, held December 13, 1878, Dr. R. F. Weir, chairman of the Committee on Surgical Procedures and Appliances, presented a report on the primary anæsthesia of ether and on the injection of carbolic acid into hæmorrhoids and other vascular tumors. Under the first head a considerable number of cases were presented, which proved that in forty or fifty seconds a condition of complete insensibility to pain could be produced which would last for a brief period, consciousness and tactile sensation being preserved. During this period, varying from twenty to sixty seconds, short operations, such as opening abscesses, incising whitlows, removing toe-nails, etc., may be performed painlessly, and in a minute or two afterward all effect of the ether

have passed away. This report has led to a very general introduction of the method into practice.

Under the second head cases were brought forward to show that the injection of a weak solution of carbolic acid (1 to 30) into internal hæmorrhoids is a safe and generally successful method of cure, and one which causes very little pain or interruption of business. It is also adapted to wholly external piles, but not to those which are likely to be grasped and compressed by the sphincter.*

At the next meeting, Dr. A. H. Smith presented for the Committee on Restoratives a supplementary report on the use of defibrinated blood for rectal alimentation, and on the use of ether with cod-liver oil. The former of these questions has been discussed at length in the ARCHIVES. As regards the latter, the adtional cases presented, 63 in number, together with the 31 included in the preliminary report, enabled the committee to arrive at the following conclusions :

1. That the addition of ether to cod-liver oil, in about the proportion of 15 minims to each half ounce (or an equivalent amount of the compound spirit of ether), will succeed in the vast majority of cases in enabling the patient to take oil, even though it previously disagreed.

2. That in some cases in which the oil still disagrees after the addition of the ether, the difficulty may be overcome by giving the ether separately from fifteen minutes to half an hour after the oil is taken.*

The next report was on the " sedative " dose of calomel, and was presented by Dr. Mary Putnam Jacobi in behalf of the Committee on Antipyretics.

It is a very able and most searching analysis of 50 cases; in which the large dose (grm. 1.5–4, 20–60 grains) was given—cases representing a great variety of diseases, and attended by very diverse conditions. They included pneumonia, pleuritis, cardiac disease, diphtheritic croup, laryngitis, ophthalmitis, irritative fever, gastritis, etc. The report goes to show that acute inflammatory processes may in some cases be materially abridged or even cut short by the calomel, given in a single large dose, repeated if necessary after 24 or 48 hours. In some instances dyspnœa not associated with inflammation was also relieved.

A decline of temperature was observed in a considerable proportion of cases to follow the dose, In regard to this, the reporter says :

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* For full report see *N. Y. Med. Jour.*, March, 1879.
† For full report see *N. Y. Med. Jour.* April, 1879.

"When this dose of calomel was followed by a fall of temperature, it was also followed by an arrest in the inflammation, and the fever did not rise again; until this was effected the temperature remained unchanged.

"In this respect the calomel differed markedly from such agents as the cold baths, salicylic acid, and, to a less extent, quinine, which may lower the temperature to the normal for a while, although the morbid process remain unaffected, and the fever be destined to return."

Purgation occurred in some cases, the number of passages varying from two to eight. In no instance was there hypercatharsis. Stomatitis occurred in only two of the fifty cases.

As to the mode of action, the reporter remarks:

"Heterogeneous as the cases are, one condition is common to all of them, namely, sudden over-distension, paralytic congestion of extensive regions of small blood-vessels. * * * It sometimes resulted from mechanical impediments to the circulation, sometimes was collateral to inflammation, sometimes the result of reflex irritation. * * * Since in so many cases the calomel relieved the symptoms dependent upon sudden neuro-paralytic congestion, we must infer that it removed the congestion itself." Whether this is effected by reflex irritation from the alimentary canal or by direct irritation of the vessels by the drug circulating in the blood, is a question which the reporter leaves to be decided by further observation; she adds:

"While a dose of 15 or 20 grains seems necessary to effect the purpose, there is no evidence—certainly none from the foregoing cases—that a larger dose has any greater effect."

"Finally your reporter would beg leave to suggest that, while a valuable utility seems to lie here in this method for appropriate cases, its indications are precise; and it should not be carelessly employed unless these really exist, and with a degree of intensity sufficient to justify so heroic a remedy."*

At the ninth regular meeting of the Committee on Surgical Procedures and Appliances, Dr. Satterthwaite, Chairman, presented a report on the various methods of treating Caries of the Ankle-joint, the Result of Chronic Disease; whether by Excision, Gouging (Chiseling or Spooning), Extension, Rest, or the Expectant Plan. This report which is merely preliminary, touches chiefly upon the last of these methods, the expectant plan. It covers 24 cases presented with great precision and exactness, and they cannot fail to lead toward deductions of very great importance. "It

* For full Report see *N. Y. Med. Jour.*, June and July, 1879.

appears from them that, so far as children are concerned at least, ordinary treatment, in accordance with simple surgical rules, and without any special operative interference, is sufficient in the vast majority of cases to effect a cure of the disease and to leave a useful joint. By the expectant plan, for example, if a joint be inflamed, entire rest is ordered ; if an abscess form, it is opened ; if loose bone be detected it is simply removed.   * * *   If in the further progress of the case a malposition of the parts be formed, a support or brace is used to correct the deformity."

Of the twenty-four cases studied, twenty-two presented suppuration in connection with caries or necrosis. Of these two died, one of acute disease not connected with the joint, and one of septicæmia ; in four cases the suppuration continued at last accounts, although they were all steadily improving. Of the remainder fourteen were treated on the expectant plan, and all have useful joints."

The Committee are further of the impression that caries of this joint must be studied apart from trouble in other joints. In children certainly, no matter how cachectic they may be, the expectant method will, if perserved in, in the great majority of cases accomplish a cure without subjecting the patient to the dangers of any such internal complications as tuberculosis or waxy change of the tissues."

Certainly this report should have the result of lessening materially the number of amputations for disease of the ankle-joint.*

The Treatment of Epilepsy.   Dr. William R. Gowers has recently related his experience in the treatment of epilepsy, and the following are some of his conclusions.

In many cases of the disease which were not benefitted by bromide he used borax, and in twelve of them with benefit. The dose is ten or fifteen grains two or three times a day.

Oxide of zinc seemed beneficial in a number of cases, and under its use the attacks " ceased " in three cases.

Bromide of zinc and bromide of camphor proved of small or no value. Belladonna and cannabis indica, (first used by J. R. Reynolds), combined with bromide have been very successful. Digitalis and bromide is an excellent combination, even when there is no cardiac disease.

Like most physicians, Dr. Gowers relies mainly on the bromides in the treatment of epilepsy. He expresses a preference for the potassium bromide, and gives it in several doses each day continually for months and years.

* For full report see *N. Y. Med. Journal* for April, 1880.

He, however, also advocates giving one large dose, 15, 20, or even 30 grammes every two or three days. This produces marked physiological effects, and wards off attacks very well.

As regards final results, the author is not as explicit as he should be. He states that of 562 cases used in the study, " the attacks ceased while treatment was maintained in 241 ; doubtless many of them relapsed when treatment was discontinued, but in a few I have been able to ascertain that the patients remained free from fits even for years after they had ceased to take medicine." (*Lectures on Epilepsy*, in the *Lancet*, February, March and April, 1880.)

[E. C. S.]

Treatment of Cancer of the female Generative Organs by a new (internal) Method.

Prof. JOHN CLAY, of Birmingham, England, reports four cases of cancer of the uterus cured by him within a few weeks by means of the internal administration of Chian turpentine. The first case is described as " scirrhous cancer of the cervix and body of the uterus " with excessive hemorrhage, much pain, and marked cachexia ; the uterus was so much destroyed that its cavity admitted three fingers readily. Six grains of Chian turpentine with four grains of flower of sulphur were given every four hours. In twelve weeks the patient was much improved in general health, was free from pain and hemorrhages ; "the parts feel ragged and uneven and do not bleed on roughly touching them. The speculum shows several cicatricial spots." The os was contracted so as to admit only one finger. In the second case an epithelioma of the os and cervix " literally melted away in the brief period of four or five weeks ;" five months after the beginning of the treatment the parts were found to be normal. In the third and fourth cases, both cases of epithelioma, equally good results are claimed.

" Other cases are under treatment, all showing similar effects. Among them are cases of cancer of the vulva, stomach, and abdomen, in which very remarkable benefit has been already produced."

Mr. Clay promises to report the results of his further experience. He says the Chian turpentine alone should be used. The use of the oil of turpentine is inadmissible on account of the speedy production of its specific effects even when administered in small doses, and the same objection applies, although in a less degree, to the Venice and Strasbourg turpentines. The maximum continuous dose is twenty-five grains daily, and it is adisvable to discontinue the remedy for a few days after it has been steadily administered for ten or twelve weeks. (*Lancet*, March 27, 1880.)

[L. A. S.]

ORIGINAL OBSERVATIONS.

CASES ILLUSTRATIVE OF THE USE OF HYOSCYAMINE.

By LANDON CARTER GRAY, M. D.

I have thought that at the present time, when the interest of the profession in the uses of hyoscyamine has been so awakened by the writings of Prideaux, any contribution to the subject would be acceptable, however fragmentary it might be. Moreover, so great a therapeutic success was attained in a case of paralysis agitans, a disease that it is ordinarily impossible to ameliorate, that this alone would warrant a publication of the following scanty details.

It had been my desire for some time to ascertain the effects of hyoscyamine when given for a length of time in doses sufficient to obtain the full physiological action of the drug, and increased progressively so as to keep up this action— given, in a word, as is arsenic in chorea, and as are the bromides and belladonna in epilepsy. The lunatics to whom the medicine was administered were selected from among those in the wards in the Flatbush Lunatic Asylum, which have been courteously placed under my charge by my friend, Dr. John C. Shaw. These patients, chronic cases, six in number, were all more or less in a state of excitement. One was a case of general paresis, in a pronounced state of agitation, at times violent, lately deceased ; another, a case of insanity with marked hysterical and sexual symptoms ; and the four remaining ones were cases of subacute mania. Merck's uncrystallized hyoscyamine was given, as above indicated, for 20 to 30 days. In three cases of subacute mania, females, the pulse, respiration, temperature and pupils were carefully examined from day to day by Dr. Ferris, as well as before the beginnning of dosage. In all of the cases the excitement

was distinctly lessened, both after the first administration of the medicine and after each increase of the dose, for a period of time varying from one to three or four days. There was not, however, any improvement discoverable in the mental impairment. Upon the cessation of the drug, they all returned to their former condition within a few days. In the three females of whom I have spoken, and to whom the medicine was administered for thirty days, the following effects were noticcd :

In one, after each increase of the dose, the pulse was quickened about four beats ; in another it was generally increased, but twice slightly reduced, and in the third it was not affected except by large doses, by which it was hastened ; in all the influence on respiration was variable, it either remaining unaffected, or being slightly increased or decreased ; in all the temperature remained unaltered ; the pupils were generally dilated, but by no means invariably so.

In one of the males there was difficulty of micturition for a day or two. The dose in these cases varied from .005 to .04 gm.

I have also exhibited the medicine in two cases of paralysis agitans in my private practice. The first one was under my care only for a short time, but was during that time much improved, the tremor absolutely leaving him for twelve hours under the influence of .005 gm. Merck's uncrystallized preparation. As decided delirium was produced temporarily by each dose, this patient became alarmed and passed away from my care in less than a week. The second case was that of a man, 61 years of age, who had suffered from the malady for twelve years. He was a typical case, one in whom could have been traced, as in a mirror, Parkinson's classical description of the disease. When I first saw him, on February 20th last, his tremor was constant and almost violent, he walked stiffly and with difficulty, had the characteristic attitude and the slow, scanning speech, hasty micturition, slept poorly, appetite poor, and complained greatly of a feeling of restlessness and of heat. He had been treated for some time with bromide of potassium and hydrate of chloral, but these had no other effect than to relieve his insomnia. I began treatment by ordering .005 gm. Merck's uncrystallized hyoscyamine, but by a mistake of the druggist the crystallized preparation was put up ; but this proved to be a very happy mistake. Marked delirium was produced at first, but the tremor ceased for a short time. I felt my way carefully, endeavoring to control the tremor as much as possible, at the same time that I diminished the unpleasant mental

symptoms of the drug. I soon discovered that the erring apothecary had unwittingly taught me an important lesson, for it became plain that the crystallized preparation controlled the tremor better and induced far less delirium or mental hebetude than did the uncrystallized alkaloid. In about two weeks the improvement was decided. The bent attitude was greatly lessened, as was also the stiff walk, the speech became comparatively quite easy, the sense of heat diminished, and the tremor and restlessness greatly decreased. Quinine and cod-liver oil were then added, and for the insomnia, which had been slightly improved, bromide of potassium and hydrate of chloral were given. The hyoscyamine has been gradually decreased, until it was found that .0008 gm. of the crystallized preparation, given at bedtime on every second night, maintained the improvement in the symptoms, but caused no stupor or delirium, which was always produced by a dose during the waking hours. For some six weeks past there has been no retrogression whatever in the symptoms, and the patient is enjoying life in a way that he has not done for upward of ten years. During the whole period, I have ordered a generous diet and a moderate quantity of stimulants.

I am greatly indebted to the enthusiasm and care of Drs. Woodside and Ferris, the two Assistant Physicians, for the notes on the cases at the Flatbush Asylum.